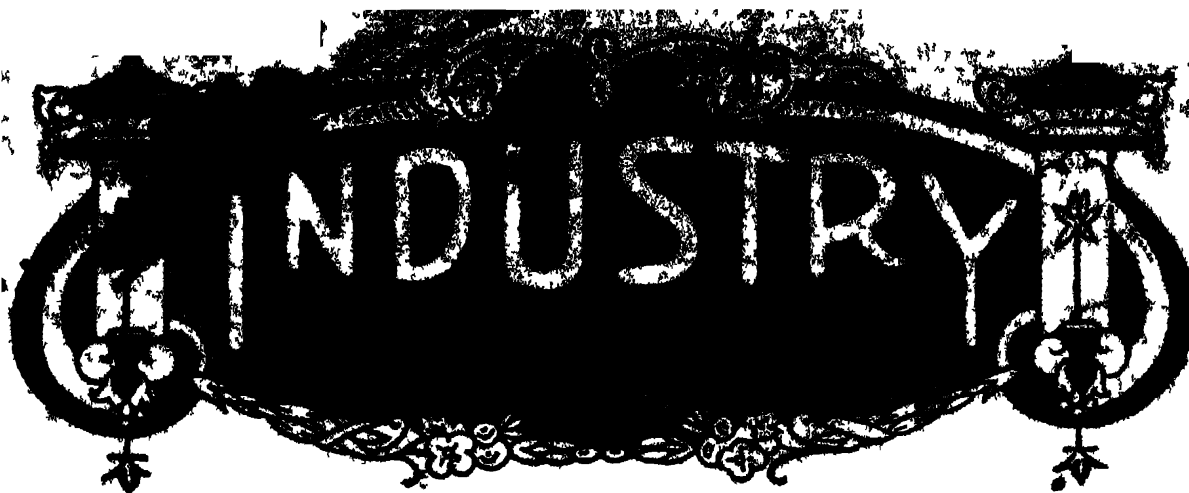


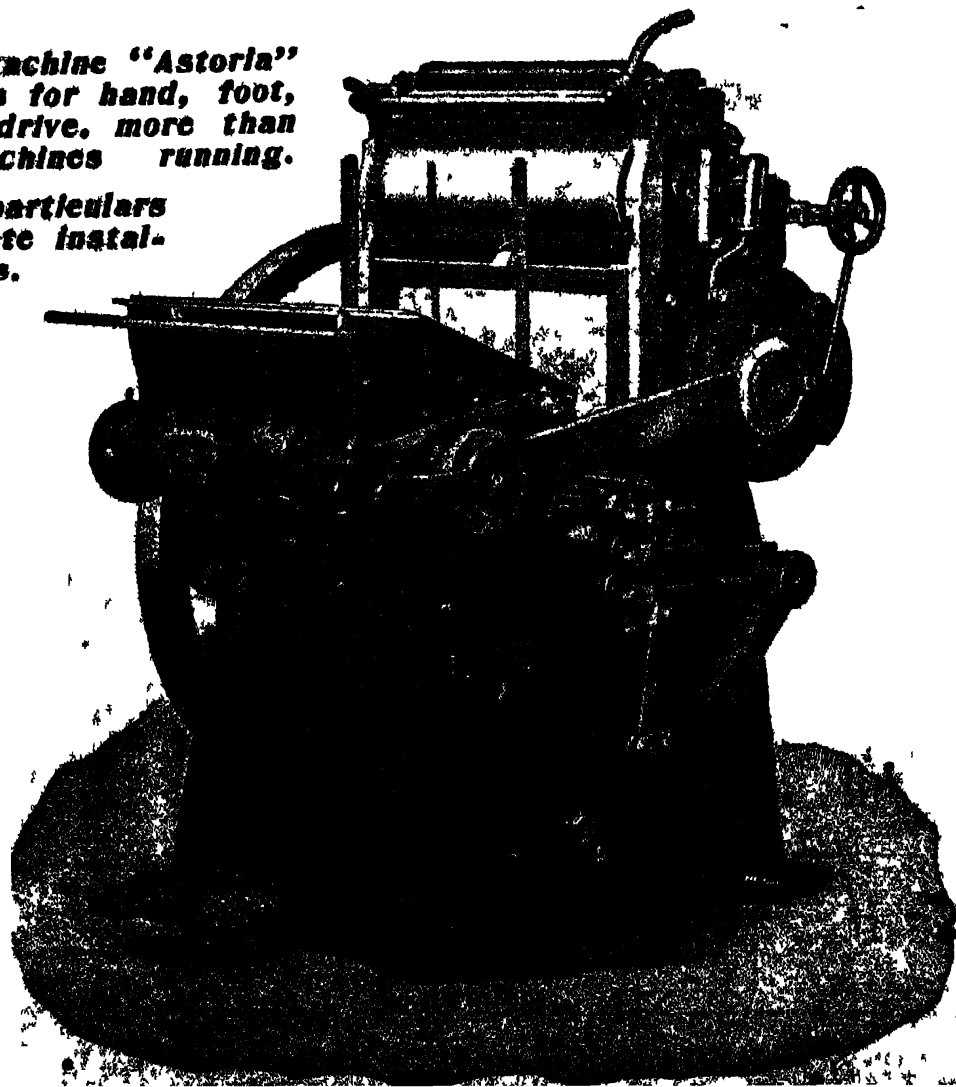


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INDUSTRY

JOURNAL OF TECHNOLOGY HANDICRAFTS & COMMERCE.

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Index to Vol. XVI—1925-1926.

Articles.	Page		Page		Page
Better Days for the Unemployed	433	Colours, Natural, Preparation of	199	Match Industry in India	248
Co-operation in Advancement	493	Concrete, Reinforced	135	Mineral Water, Manufacture of	198
Co-operation in Education	541	Cutch Manufacture in Siam	26	Modelling of Plaster	215
Forward Step, The	65	Date Sugar Manufacture	310	Paper, Preparation of	11
Making Life Worth Living	582	Distillation, The Processes of	188	Paper Manufacture	17
Our Purpose and Progress	1	Dry Battery and Electric Bell	383	The Industry, The	313
Our Villages	273	Dyeing Recipes	246, 309	Plantains and Bananas	581
Passing of Deshbandhu	121	Essential Oils, Preparation of	588	Porn Specialties	318
Progressive Move, The	177	Film Industry, The Indian	355	Ribbon Making	8
Self-Sustaining Village, A	338	Fire Works, Pylon	318	Rose Water, Manufacture of	135
When You Cannot Make up Your Mind	233	Flash Light of Chances	67, 123, 231	Rubber, Cera, Industry of	181
Unemployed, The	385	Floral Oils, Preparation of	541	Sawdust, Uses of	350
Articles, Special		Flour Milling Industry	235	Shedding of Wool	83
A Neglected Field	86	Foot Ball: Its Making	195	Shilling Corporation	505
Art-Crafts:		Ford, Henry, Gigantic Works of	90	Silk Industry, The	20
Arts and Crafts of Burma	5	Forests, The Advantages of	358	Silk Industry, The	397
Bananas in Travancore	591	Ginger Cultivation	77	Silk Industry, The	501
Bee-keeping, The Art of	391	Glass Blowing, The Art of	80, 132, 185, 241	Silk Industry, The	501
Billiard Balls, Making	134	Grass, Economic, of India	69	Silk Industry, The	501
Biri Making	85	Hair Preparations	506	Silk Industry, The	501
Bleaching Powder	556	Horticulture	348	Silk Industry, The	501
Bleaching, The Occurrence of Faults in	198	Horticulture, Grafting in	137	Silk Industry, The	501
Blue, Chinese	353	Hulwa or Indian Porridge	142	Silk Industry, The	501
Brewing and Malting	459	Ice Making	27	Silk Industry, The	501
Bricks, Glazed	353	India and the Match Industry	109	Silk Industry, The	501
Burma, Arts and Crafts of	5	Industries, Small	467	Silk Industry, The	501
Calcium Carbide	305	Kulpi Baraf	30	Silk Industry, The	501
Canning, Fruit	354	Lances and Stars	318	Silk Industry, The	501
Canning Prawns	205	Magical Box	501	Silk Industry, The	501
Catechu, Preparation of	502	Malaria, Campaign against	23	Silk Industry, The	501
Ceramic Industries	179	Manure, On	20	Silk Industry, The	501
Cheese Making	347			Silk Industry, The	501
Clays, On the Nature of	344			Silk Industry, The	501
Coakar	342			Silk Industry, The	501
Coffee Industry	249			Silk Industry, The	501
Indian	249			Silk Industry, The	501
Coloured Tiles	379			Silk Industry, The	501
				Silk Industry, The	501

Brief Queries and Replies
 Pages—45, 107, 165, 221,
 264, 324, 372, 413,
 480, 528, 565, 607

INDUSTRY INDEX 1926

	Page.		Page.		Page.
District Possibilities.		Galvanizing Process	519	Oil, Clarifying & Re-	
Cawnpore	148	Gilding, Contact	41	fining	322
Chhatarpur State	247	Ginger Liquer Essence	416	Paint, Luminous	44
Nepal, Trade with	407	Glass Bottles, Cutting	103	Paint Remover	602
Tripura State	202	Glass, Cleaning, About	599	Painting, Cleaning	601
Formulas		Glass, Engraving on	370	Paints & Varnishes	214
Processes		Glass, Frosting	413	Papier Mache	415
Answers.		Glass Making	369	Pills, To Sugarcoat	162
Absorbent Cotton	162	Glass, Painting on	368	Polish, French	366
Alloy, Aluminium	39	Glass Pots, Etching	413	Polishes for Aluminium	104
Copper	479	Glass, Red	44	Poppy Seed Oil	521
Alloy, Silver-Nickel	517	Glycerine from Oil	476	Potato Preserving	43
Alloys, Gold-Copper	517	Gold Laces, To Clean	41	Pyrogallie Acid	604
Aluminium Utensils,		Gripe Water	106	Rasant from Barberry	479
Cleaning	518	Hair Oils, Colouring	261	Rennet & Its Pre-	
Bait, Fish	368	Hardening Case	215	paration, The	603
Benzoin, Tincture	216	Havana Flavour for	164	Rose Powder	603
Bird Stuffing	366	Tobacco	164	Rubber Latex, Properties	600
Blackening, Self-shining	477	Indigo & Sulphuric	522	of	600
Blacks, Manufacture		Acid	259	Ruby Glass, Making	103
of	520	Ink, Fountain Pen	106	Rum from Molasses	40
Blue, Burnswick	519	Ink, India	105	Rust Preventing	369
Books, Preserving,		Ink, Printing, Varnishes	104	Salt, Glauber, Manufac-	
From Insects	101	For	101, 601	ture of	220
Brass, Colour of	518	Ink Stains, Remov-	367	Saponin & Its Prepara-	
Butter, Preserving	104	ing	215	tion	161
Camphor, Preparation	520	Ink Stains, Removing,	218	Sarsaparilla, Indian	479
of	40	From Linen	102	Scents	416
Candle Making	108	Ink Stencil	216	Sewing Machine Oil	367
Carbon Paper	215	Ink Tablet	218	Size, Gold	261
Case Hardening	214	Inks, Copying	216	Slate Artificial	42
Cassava Flour	369	Inks for Brass Seals	259	Slate Pencils	413
Castor Oil, Deodoris-		Inks, Lithographic	163	Soap, Bar	415
ing	599	Ink, Printing,	371	Soap Camphor &	
Castor Oil Mixture	517	Colours for	263	Carbolic	219
Chalk, Uses of	321	Jewellery Cleaning	602	Soap, Castor Oil	604
Citric Acid, Manufac-		Khair or Extract of	477	Soap, Depilatory	39
ture of	43	Catechu	107	Soap, Powder	263
Coconut Butter	602	Khaki Colour	367	Soap, Rosin	476
Cologne Water	41	Lacquers	102	Soap, Settling Changes	
Contact-Gilding	161	Lamp-black	220	in	258
Copper Refining	162	Lead Shot, Preparing	39	Soap, Toilet	44
Cotton, Absorbent	475	Lead, White or Red	218	Soap, White Alabaster	519
Cotton Cloth, Linen	371	Lice Killer	44	Soap, White, Coconut	
Finish of	320	Lime Juice Cordial	217	Oil	521
Cream, Starch, Gloss	517	Liquid Ammonia,		Soaps, Blue & Grey	
Cuttle-fish Bone	323	Preparing	602	Mottled	258
Deodar Oil	260	Liquor Bismuthi et	42	Soda Manuf.	
Dextrin, Preparation	39	ammonii Citratis	101	Le Blanc	42
of	163	Louse Killer	478	Solders, Brass	
Discharging, White	368	Lubricating Oil, Mineral	101	Solders for Aluminium	
Drier, Leadless	259	Margarine, Vegetable	478	Solders for Metals	
Drugs, Crude, Extrac-	106	Matches, Strike-any-	475	Spots and Stains from	
tion of	414	where	599	Leather, Removing	
Duplicator, The Use		Mercerising Cotton	106	Sugar Candy	
of a	416	Yarn	41	Sugar of Lead	
Duplicator, To Make	519	Metal Polishes	217	Tattoo Marks,	
Dyeing Yarns, Red	519	Mirror, Amalgam for	216	Removing	
Egg Preserving	414	Mother-of-Pearl,	218	Tea, Blending	
Enamel, Black, for		Dyeing	602	Tooth Paste	
Cycle	320	Naphthalene, Manufac-	415	Toy, Small Lead,	
Eucalyptus Oil	368	ture of	601	Casting	
Fat, Clarifying	368	Nickelling Small	415	Turkey Red Oil	
Ferro-gallic Process		Articles	215	Typewriter Ribbons,	
of Printing	320	Oil & Grease Stains,	43	Re-inking	
Fish Bait	600	Removing from Linen	164	Varnish, Asphalt	
Formic and Acetic	366	Oil, Bleaching	215	Varnish, Copal	
Acid	262				
French Polish					
Galvanizing Iron					

INDUSTRY INDEX 1926

	Page		Page		Page
Varnish Printing	522	Industrial Development		Book on Hydro-	
Vinegar, Essence of	215	in Baroda	315	pathy, A	175, 538
Vinegar Making from		Industrial Progress in		Book on Naturo-	
Rum	104	Bengal	255	pathy, A	620
Walch Maker's Oil	42	Industrial Research in		Book on Sexology, A	492
White, Pearl, Liquid	604	Bengal	514	Booklet, A	62
Yarn, Bleaching	603	Industrial Uses of		Booklet, An Interesting	174
Yeast, Artificial	414	Mica	208	Boot Cream	231, 335
Yeast, Brewer's	262	Industries of Burma	155	Boot Polish	335, 620
Yeast, Pure Culture of	369	Industries of Cambay	3	Business Magazine, A	174
Ideas For Small Capitalists.		Industries of Ceylon	95	Business Primer, A	63
Buttons from Nux		Jamshedpur Technical		Buttons	231
Vonuca	593	Institute	4	Buttons, Attractive	383
Digestive Powder,		Lac Production in India	311	Calendar	63
Manufacture of	360	Madras Textile Institute	4	Calendars	579
Electric Powder	359	Manganese Ore in		Calendars &	
Magician, Re a	91	India	156	Almanacs	539, 620
Mineral Water Manufac-		Mango Industry of		Cereal Food, A	431
tecture	32	Bombay	472	Chair, Folding	231
Occupations for Purda-		Mineral Industries of		Cinnella Oil	335
nashin Ladies	92	India	388	Cleansing Agents	491
Sewing Machine Oil	360	Paddy Cultivation in		Correspondence	
Silk Industry, Mul-		Madras	558	Course, A	120
berry	150	Papaw Cultivation in		Correspondence Insti-	
Toilet Powder	360	Ceylon	209	tute, A	119
Tooth Powder,		Products of Ceylon	314	Cravens	62
Menthol	360	Progress in All Ducec-		Cutlery	62
Vinegar, Manufac-		tions	472	Detergents	62
ture of	359	Progress in Bengal	96	Digestive Medicine	174
Waterproof Cloth,		Silk Industry of Bihar	208	Efficient Pumps	538
How to Make	360	Silk Institute in Bengal	472	Embossing Machine	383
Wine Apparatus for		Sugar from Palmyra	255	Engineering by Corres-	
Laboratory Use	510	Textile Industry in		pondence	431
India's Industrial Progress.		Mysore	96	Fancy Scale	538
Agricultural Board of		Textile Industry of		Ferro Printing Paper	619
India	208	Trichinopoly	411	Floral Essence	383
Agricultural College		Wealth of Bihar	596	Forest Products	231
in Burma	3	Wireless Development	209	French Reader	58
Bihar Industries	3	Miscellaneous.		Fruit Preserve, A	538
Burma Salt Industry	315	Age of Co-operation,		German Paper, A	119
Calico Prints in Bombay	155	The	583	Government Technical	
Canning and Bottling		Apul will be the Co-		Reports	539
Industry	3	operation Number	581	Greetings	519
Chemical Industry in		Dusserah is Over	337	Gupathi Book, A	335
India	596	Have you any Day		Hu Oils	231
Cottage Industries of		Dreams	387	Handkerchief Perfumes	538
Bengal	315	Home Hunts	319	Hectograph, A	174
Cottage Industries of		New Idea Prize Award		Helpful Chart, A	491
Ceylon	558	for Vol. XV.	173	Hindi Magazine	383
Cotton Growth in		New Prizes for Vol		Household Journal, A	579
Ceylon	596	XVI	61	Industrial Bulletins	533
Cotton Research Institute		New Prizes for Vol.		Ink	62
in C P	96	XVII	594	Ink Powder	62, 383, 431,
Dairy Industry in India	95	Note	119, 578		619
Damp-proofing Matches	392	Resolve for 1926	494	Ink Spoon	431
Ferozabad Glass		Unemployment		Ink Tablets	231
Industry	156	Number, The	337	Ink, Writing	231
Glycerine in Madras	472	Wipe out Money Lenders		Journal on Thera-	
Hand-loom Weaving		But	275	peutics	431
in Madras	596	Notices & Reviews.		Juvenile Magazine	383
Hand-Weaving Industry		Acknowledgement	62	Leather Goods	272
in Bengal, The	209	Acknowledgments	62, 491	Magic Pad	62
Home Industries of		Antiseptic Incense	619	Magic Writing Pad	119
Bengal	41	Benevolent Society, A	175	Manual of Type-	
Hydro-Electric Schemes in		Bengal Cottage		writing, A	174
South India	362	Industries	492	Marking Ink and Gas	
Improvement in Indian		Blotter, A	431	Mantle	119
Cattle	514	Blotting Pad	579	Marking Ink, Red	119
Indian Tobacco & Cigar	558	Book on Eugenics, A	175	Mass Education	491
India's New Sea Port	255	Book on Health	335	Metal Polish	579

INDUSTRY INDEX 1926

	Page.		Page.		Page.
Miniature Intaglios	619	Continent, A Lost	160	Wood, Plastic	211
Money Making Books	491	Cotton Plant, Grafting	157	Wool from Wood	365
New Year Greetings	339	Cremated with Your		Small Trades & Recipes	
Ointment	272	Heat	160	Billiard Table, Making	361
Pain Balm	383	Cure by Colours	559	Biscuits, Wafer	557
Panacea, A	491	Diet, Proper, Value of	159	Brass Name Plates,	
Patent Medicine, A 174	231	Electric Stethoscope	473	Etching	206
Patent		Fibre, Vulcanized	98	Brasses, Ornamental, To	
Medicines	63, 272, 335	Film, Care of	158	Clean	206
Photo Rings	131	Fruit Preservation, The		Buffing, Covering, Com-	
Picture Cards	62, 383, 491	Achievements of	37	position for	154
Primer for Learning		Fruits, New Making	160	Candied Ginger	254
English, A	174	Glass Romance of	97	Candies, Green Colour	
Printed Tin	538	Gold from Mercury	317	for	254
Progressive Library, A	335	Gill, Synthetic	316	Cattle Embrocation	94
Railway Framing	431	Hair, Curiosities of	157	Cement for Floors	154
Religious Tract, A	538	Honey-Bee, Useful-		Confectionery Drops	154
Rubber Stamp	383	ness of	412	Copper, Silver Plating	94
Rubber Stamp Ink	383	Houses Built of Glass	257	Cordial, Infant's	557
Scientific Society, A	63	Indian Cattle, Improve-		Egg Syrup	595
Sidha Laxmi Vilas	119	ment of	514	Enamelling Photographs	361
Soaps	62	Indian's Gift for an		Face Cream	513
Substitute for Tea and		Observatory	213	Leathers, Cleansing	410
Coffee	538	Industrial Research in		Fire Extinguisher	313
Technical Manuals,		Benegal	514	Flux for Enamel	595
T&G	231	Larynx, Artificial	98	Fruit Artificial	254
Thoughtful Pamphlet,		Light, Cold	316	Furniture, Care of	94
A	49	Light in Food	473	Furniture Polish	595
Thoughtful Pamphlets	619	Light, New Theory of	364	Glass to Transfer Prints	
Tobacco Products	538	Lightning Conductor,		to	410
Toilet	231	The	257	Hair Restorer, Sage and	
Toilet Articles	174	Machine with a Brain	597	Sulphur	94
Toilet Products	539	Man 300 years Hence	265	Honey, Preserving	471
Toilet Scents	431	Moon, Birth of the	316	Ice Flowers, Artificial	35
Tooth Powder	231, 538	Muscle as Medicine	256	Indigo, Artificial	557
		Muscle to Speak, For	210	Ink, India	513
		Paper Sheet Feeder, A	539	Ink For Tinware	410
Trade Directory, A	579	Plants as Surgeons	211	Inks for Marking	
Trade Journal, A 120	174	Porcelain Manufactured in		Packages	595
	431	Our Bodies	412	Jam, Gooseberry	254
Typewriter Ribbons	383	Porcelain Stones,		Jewellery, White	
Typewriting Simplified	231	Testing	157	Enamel for	557
Urdu Monthly, An	231	Printing by Camera	471	Metal Polish	557
Useful Chemical, A	231	Radio Eye, The	473	Motor Car Bod-	
Useful Diary	579	Radio Wonders	210	Polish	35
Useful Institution, A	120	Scout & Memory	212	Pain Ointment	513
Valuable Biography, A	120	Seating & Dyeing		Paint, Luminous	595
Vernicelli Making		Machine	560	Paper, Painted	206
Machine	175	Silk Invention, New	97	Paste, Gooseberry	254
Vernacular Magazine, A 174		Stains on Chrome		Rat Poison	595
Warping Machine,		Leather	256	Rubber Solution	410
Automatic	335	Star Map	597	Sherbat, Persian	35
Young, Advice to the	491	Steel, Seeing through	597	Shoe Polish	595
Scientific & Technical Topics		String Sounds on Steel	364	Silver, Cleaning	206
Air Service, England-		Tennis Ball, A Gas-		Snake-Bite, What to do	
India	35	filled	212	in Case of	471
Air to Anywhere, By	412	Tin Foil in China	36	Soda Water without	
Alloy for Diecasting,		Trees that are		Machine	35
New	159	Almanacs	363	Sponges, Bleaching	313
Botanical Magvels of		Vegetable Gems	100	Starch, Wheat	471
Food	37	Vegetable Ivory	560	Steel Springs	
Brains Broadcasting	559	Vegetable Oils, Uses of	256	Tempering	313
Centrifugal Oil Purifier	37	Vegetable Surgery	99	Tobacco, Fermenting	
Chinese Paper Umbrella	99	Wax Artificial	98	Varnish, Pale, Long	
Cinema Films, Plastic	560	Weather Signs	159	Tende Engraving	
Coal Distillation	474	Wing Motion of Insects	363	Pages	63, 120, 174
Coconut Pearl	38	Wireless Marvel	317		
Cold Light	316	Wireless Pictures for			
Coloring of Wood,		All	597		
Ammonia	38				

Industry

A JOURNAL OF TECHNOLOGY, HANDICRAFTS & COMMERCE.

VOL XVI.

CALCUTTA, APRIL, 1925.

NO. 181

Our Purpose & Progress.

FIFTEEN years of humble yet useful life of INDUSTRY have passed and it is running in for the sixteenth with this issue. INDUSTRY was indeed not a big undertaking—the beginning was a small one—a tiny four-folder yet aiming at some big thing. INDUSTRY has passed its fifteen years of service and life.

Great enthusiasm for a patriotic duty was the only capital the conductors of INDUSTRY had when it was first brought to light fifteen years ago. Humble were their aspirations and the requirements of its readers and our enthusiasm although menaced with hundreds of witting doubts and discouragements, was fittingly reciprocated in the country. INDUSTRY was ushered into being, its energies being focussed on the one big thing—to create an industrial atmosphere in the country so that the mentality of the people of the country would be diverted to the paths of independent industrial achievements from the well-grooved line of office-hunting. In its infancy hundreds of interloping

interests assailed the stability of the great determination, thwarting details threatened the fixity of our great purpose when the great war intervened and the great necessity of industrial activities in the country dawned upon our people. There the great latent possibilities were engaging the attention and consideration of our countrymen, great openings hitherto unexplored for the expansion of our manufacture were being found out and gradually greater number of progressive people were availing themselves of the opportunity INDUSTRY was then offering in its humble way.

Far too much of our manufactures, our minings, our industries, our agricultural trade, our farming was in the hands of outsiders. Credit is indeed due to them for seizing the opportunities yet as an after-war effect, our eyes are opened leading more and more of our men to the path of achievements in these fields. More of our people have now been associated in coal mining and tea manufacture, in leather industry and chemical manufactures; scientific

agriculture is making slow yet steady progress among our young men; mechanical industry is also receiving its quota and trained hands are not exactly a scarcity now-a-days as it was ten years back.

INDUSTRY was started with the object of "creating among our countrymen an industrial sect who would learn to use every moment of their active life in doing something to the advantage of themselves and the community—in manufacturing articles of every day use—in building up useful trade—in making themselves thoroughly practical men with knowledge of a variety of money making means and ways." INDUSTRY has been evolving this idea for the last fifteen years and will go on till evolution from small beginning to big growth becomes the law within the circle of its readers. Choice of a field is nearly always the first step—not infrequently a choice dictated by chance, by circumstance or the equipments available—for the growth in the business or avocation of life. INDUSTRY offers this first step, INDUSTRY creates the circumstance and provides the equipment of success, and enables its readers to follow expansion gradually step by step, department by department as profitable returns are promised. Safe growth this is—the surest undeniably, where resources do not equal opportunity.

Yet this is not the only way to grow. Given an opportunity—that vital thing which presents itself something in the form of a patent, again as an unoccupied field of production, an undeveloped market, new and economical factory

methods or more efficient manufacturing and pushing schemes—a business may be built like a sky-scraper. Practical experience and mastery of a chosen field make it possible for a creative mind to lay out a new industry as completely and entirely as an expert chess-player operates his moves.

Besides creating a field for industrial activities, INDUSTRY provides for this mastery of industrial arts, teaches a thousand and one ways of making money, of giving wide-awake men ideas and suggestions by which they may materially and essentially improve their fortunes or increase their happiness. INDUSTRY claims to be a progressive journal and with the progress of efficiency among the people of the country in the line of industrial development, INDUSTRY shows progressive lines of growth all round. This issue is the mouth-piece of what this sixteenth volume will be and every following issue will be a development over its predecessor.

INDUSTRY cordially invites its readers to regard it as their own paper, to make it their individual, personal and patriotic duty to further the objects of the paper by circulating its teachings and by using its pages to give to other the benefit of their experience, and learning from others of their failures and successes. We undertake to do our part towards making this a "live" paper brimful of success-achieving suggestions and it is up to all our readers to support us and so extend the usefulness of the paper that every Indian progressive man will feel that it is absolutely indispensable to him.

INDIA'S INDUSTRIAL PROGRESS.

Agricultural College in Burma.

With the opening of the Agricultural College and Research Institute at Mandalay, a bright and new era has dawned in the agricultural history of Burma. In providing training ground for the pioneer scientific agriculturists, research workers, and other moulders of the future agricultural progress, the College will serve the great and urgent need of a country like Burma where more than 70 per cent of the people belong to the agricultural class.

Canning and Bottling Industry.

It is reported that an Indian concern plans to erect a small plant at Poona, capable of turning out approximately 1,000 cans of tinned products daily, where fruits, vegetables, jams, jellies, marmalades, juices, syrups, pickles, chutnies, condiments, vinegar, candies, and confections will be prepared for local and foreign trade. The plans include also the erection of additional plants at other centers, should the first venture prove successful.

Industries of Cambay.

The chief manufactures of the State of Cambay are cotton and silk fabrics and various articles of agate and cornelian stone. There are in the State

3000 hand-loom, giving employment to more than 5000 persons. There are three flour mills, one oil mill, two glass factories, one ice factory and two match factories. The supply of electricity to the capital has given stimulus to these industries. Even small industries, such as bangle-making, grinding agate and cornelian stones, weaving looms, etc., are now worked by electric power instead of manual labour.

Bihar Industries.

A provision of Rs. 85,000 has been made by the Government for a match factory. The project is the result of an enquiry into the prospects of the match industry in Bihar and Orissa conducted by an expert on the recommendation of the Board of Industries. The objects of the scheme are to show that good matches can be made at a profit in a well-equipped factory in India; to enable persons to see all the best types of match machinery in action, and to train those who so desire in making matches with up-to-date machinery. The factory will also test on a commercial scale match woods from all part of the Province.

About five lakhs of rupees have been earmarked for technical and industrial education in the state, and provision has also been made for the award of a

three State Technical Scholarships this year for training in mining, each scholarship costing the Government on an average about Rs. 16,000.

Madras Textile Institute.

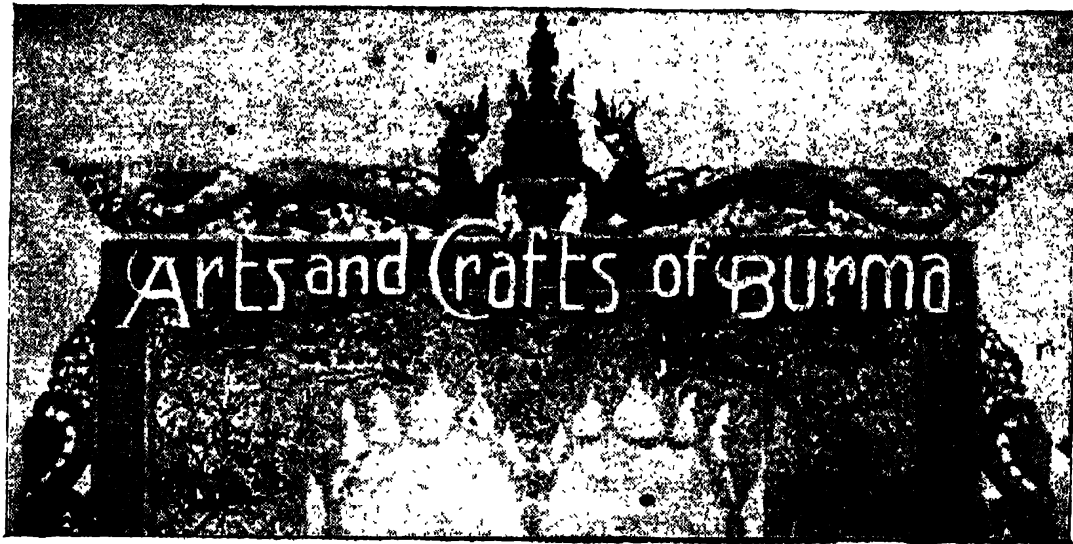
The Madras Textile Institute was established in 1922 for manufacturing various types of handlooms, warp and woof preparation machinery for the requirements of several classes of weavers and to serve as a central distributing factory for the supply of improved weaving appliances and accessories connected with the handloom industry, and also to afford practical training to weavers employed in schools. The Institute was first devoted to the training of the personnel of the weaving parties, and to the construction and demonstration of improved appliances. The scope of the Institute has since been greatly enlarged and, in addition to providing practical training for weavers, mistries and teachers in producing and supplying machine-made warps, it also demonstrates the weaving of various fabrics with the aid of improved looms and appliances. Several other schemes for improvement and for establishing classes in lace, embroidery, and knitting are under consideration. The usefulness of the Institute has been fully established and it is attracting an increased measure of attention from the weaving community and the general public. The instructional side of the Institute is reported to be developing rapidly as there is a considerable de-

mand for the services of men trained there for employment as teachers of weaving in vocational schools.

Jamshedpur Technical Institute.

The Jamshedpur Technical Institute was opened by the Tata Iron & Steel Co. Ltd., towards the close of 1921. The Company has always recognised the necessity of training Indians to hold the superior positions in the works, especially in view of the increased plant which is now being brought into operation. No facilities for such training previously existed in this country, and the Company realised that if men were to be trained, it would have to provide facilities for this from its own resources as with such assistance it might obtain from the Provincial Governments and the Government of India.

The Institute is probably the only example in India of a technical education which ensures satisfactory employment, in the industry for which the man is trained, on his completing the courses satisfactorily. The ideal of technical training has very seldom been realised. The students of the Technical Institute, if their ability and application are satisfactory, are at once, on leaving the Institute, provided with suitable posts in the works of the Company. The Institute is supported by grants from the Governments of Bihar and Orissa, Bengal, Punjab, Mysore, and by the Company.



THE exquisite specimen of wood carving which is adorning the title of this article gives but an inkling of the wonderful arts and crafts of Burma. The keen sense of artistic perception as manifested in the handicrafts of a people who are idyllic by nature could only be developed in a land which has been fittingly styled the Silken East.

Of the domestic industries of Burma cotton-weaving is the most important and wide-spread. The loom is a feature of nearly every house in certain localities. Silk weaving is a purely professional industry, and is wholly the product of hand labour. The best Burmese silk is woven from Chinese silk thread, purchased raw and treated and dyed locally. Neither embroidery nor carpet weaving exists as a wide-spread local industry.

METAL WORK.

Burma has for many years been known to have attained high proficiency in wrought iron. Near the Arakan pa-

goda of Mandalay numerous workshops exist for the production of the iron Thees or the umbrellas placed as weathercocks on the pagodas of Burma. Of Thees there are two widely different forms, the Burmese and the Shan. Silver bowls, jars, plates etc. are produced in Rangoon, Moulmein, Toungod, Prome and Thayetmyo from silver plates.

There are two widely different styles, one characteristic more or less of Rangoon, the other of Moulmein. In the former the surface is frosted, in the latter polished or burnished. In a Rangoon bowl the main surface of the silver is usually left a dull white, with small portions of the design here and there burnished. In both styles of work the silver is strongly repoussed and mainly in human forms or with belus in hunting or sporting schemes. The principal articles made by the Burman silversmiths are the well known bowls.

In the style known as Double work or Moulmein, the design is embossed as usual but the ground is perforated. The article is, in consequence, lined, a space being left between the other perforated portion and the lining. A rich effect is thus obtained through the shadows of the outer perforated surface being thrown on the inner lining.

The Burmese brass and copper crafts are displayed in large assortments of idols of different heights. The gongs of Burma are famous all over the world and are of two kinds, round and triangular.

POTTERY.

The pottery of Burma, more specially of Pegu has been famed from ancient times. In fact Pegu jars or *martaban* jars were once very popular. This comparative antiquity of the Burmese ceramic art has been proved beyond doubt.

The most curious forms of Burmese pottery are the quaint urns used for storing the ashes of the *Hpungis*. But the *Martaban* jars and water vessels are by far the most interesting. In shape and method of treatment of the clay and of the colouring material these might be placed alongside of the ancient Greek and Roman pottery.

It is said that Burma acquired its knowledge of pottery, more specially its glazed wares from China.

Examples of Burmese glass mosaics are common. The material used to fix the glass in the mosaics is the sap of a tree known as *thitsi*.

WOOD WORK.

The great development of all the arts available for the ornamentation of wood work is due to the fact that the majority of the Burmese people live in wooden houses and that masonry edifices have been generally prohibited except in the building of pagodas.

Then again the admirable nature of the very abundant teak wood of Burma naturally aided the aspirations of the people for artistic houses. Wood carving in Burma has also become an art in which superfluity of wealth has dictated exuberance in treatment.

Immense sums have, and are still expended on woodcarving in Burma, with, in consequence, exceptionally high wages paid to the most skilled carvers.

Underneath all Burmese art undoubtedly influenced by Buddhism there is a strong vein of the ancient demon worship, now a deep rooted superstition. The distortions and twistings of the floral carvings in wood and ivory, of the draperies of the sculptures, of the painted cloud effects, of the attitudes and expressions of the human figures, each and all are tainted with the *bilu* or demon. So all-important is this feature that without a knowledge of its existence most of the designs are inexplicable.

In Burma there may be said to be three very distinct styles of woodcarving—the bold massive form seen on rudder chairs of boats, etc. the deep and elaborate undercutting of the screens at the pagodas



Lacquer Work of Burma

simple incised carving of the house doors and window shutters.

IVORY.

The traditions of Burmese ivory-carving point to its derivation from India. There are said to be three centres of this carving, viz. Moulmein, Pyinmana and Rangoon. The articles chiefly turned out are handles to swords, daggers and knives, picture frames; paper cutters; stands for silver bowls; chessmen; chairs, images of Gautama Buddha, etc. Whole tusks are carved with as many as 20 to 30 statues shown within a trellis-like covering of pierced ivory to which the tusk has been reduced.

* MISCELLANEOUS.

Mat weaving is a popular industry.

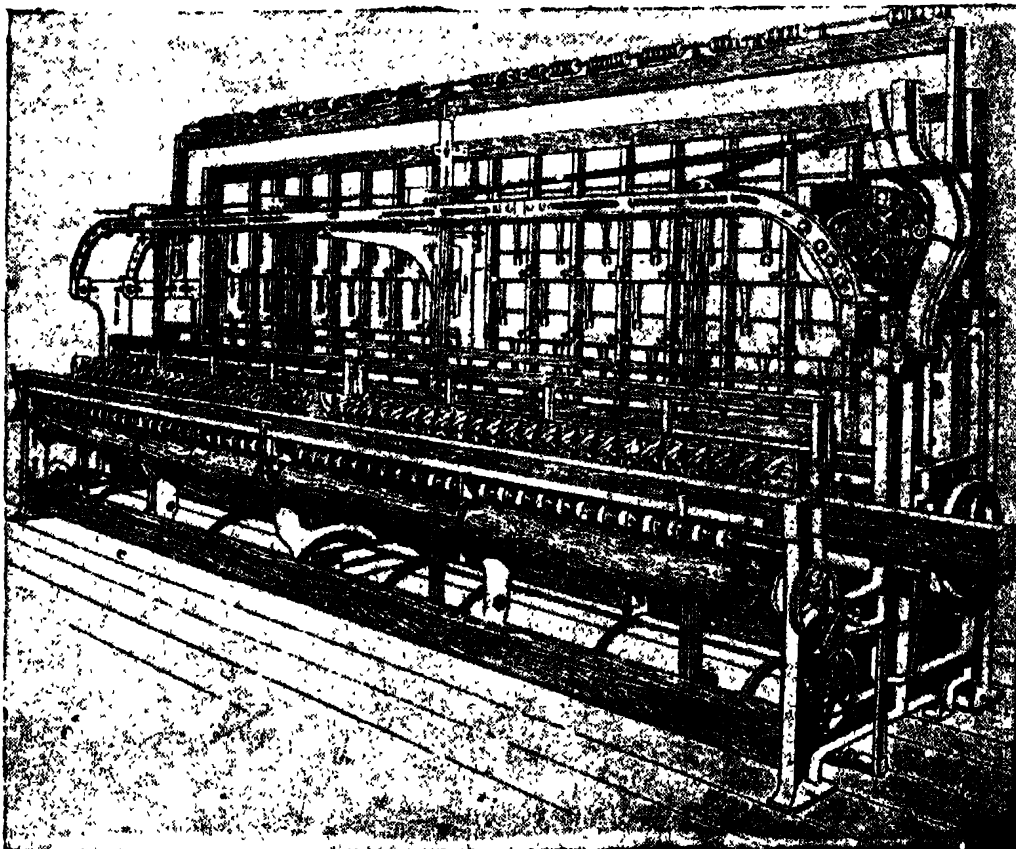
Mats are of various kinds. The commonest sorts are of bamboo, the better kinds are woven of cane and reeds. These used for sleeping on are known as *thinbya*. A rough paper used for wrappers, umbrellas, and the like is made in Monguay and elsewhere in the Shan States from the white inner bark of a species of mulberry-tree known to the Shans as *maisailé*.

Cart and boat building are two of the important industries of the Province. Cheroot making is a home industry widely practised. Indeed Burma cheroots have become known throughout the world. Basket-weaving is also an important occupation yielding pleasing and useful products.

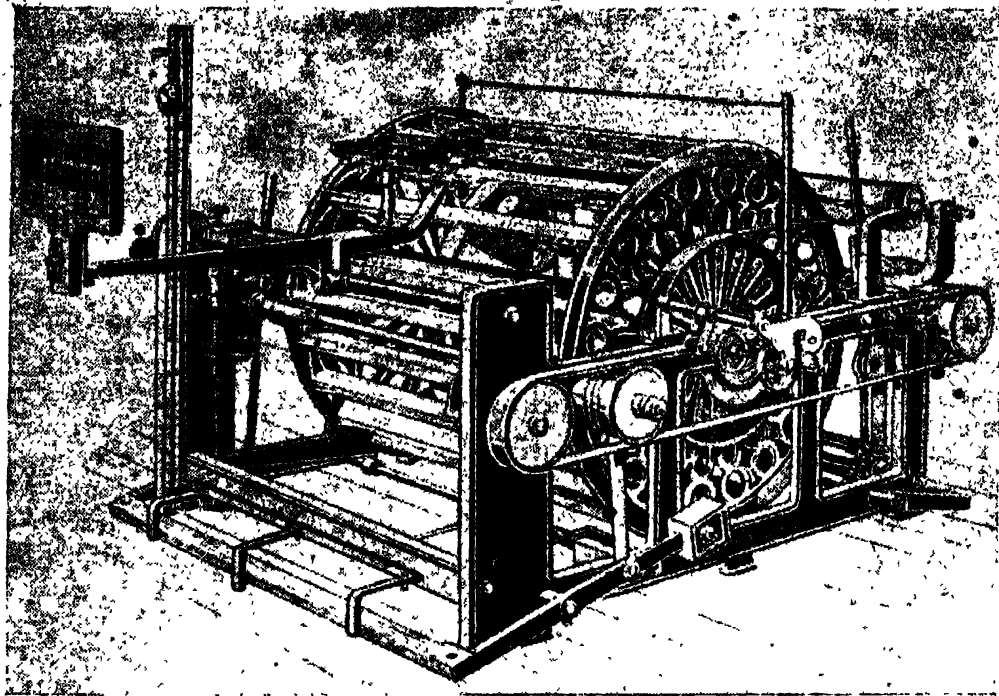
Ribbon Making.

RIBBON is a name given to silken bands of various widths and colours, much used by females for head dresses and other purposes. They are both plain and figured, and are sometimes distinguished into sarcenet, satin, taffety, chine, watered, etc., according to the manner in which they are made. They are also frequently ornamented by having what is called a *pearl edge* given to them. Ribbons are woven in pieces, each 36 yards in length. The finest are made entirely of the best Italian and French raw silk, and the common raw silk, and the common sorts of China, Japan, and Bengal silks. The finest and heaviest ribbons comes from St.

Etienne in France which is the principal seat of that branch of industry in the world. Basle in Switzerland is the second place in importance for ribbons of medium grades, plain or simply striped. Black and plain ribbons are also extensively made at Crefeld, in Rhenish Prussia. The superiority of French ribbons is partly due to being made on hand-looms while at Coventry in England ribbons are made with power looms. The manufacture of ribbons in U. S. A. is also an extensive industry. Useful cotton printed ribbons are produced in England; they are very cheap and tasteful, and take printing better than silk. A mixture of silk and wool has been applied in a somewhat similar way.



Tape Loom.



Combined Warping and Beaming Machine for Ribbon Weaving.

RIBBON WEAVING.

Ribbon looms differ from others in various ways : the narrow width of the products necessitates the special arrangement of the frames and organs to turn out several pieces at one and the same time. But this simultaneous manufacture does not allow of launching a single shuttle from one end to the other of the batten as is the case when weaving broad pieces. The guidance and transport between the selvages of each ribbon has to be secured by a number of shuttles equal to that of the pieces being woven. The movement of the shuttles is generally brought about by the interposition of a long horizontal rack, sliding on the latter and carrying by means of one or two pinions per ribbon short racks fixed inversely to the back of each shuttle.

The let-off takes place—according to the ribbons to be made—by a larger or smaller number of bobbins or warp rollers in the rear of the loom, and can be carried out with fixed bobbins, tension rollers or automatically.

The warp threads in the one or the other of these special cases are, according to kind of manufacture in view, taken from above the top castle rail or passed straight into the appliance for separating the warp. The position of this warping appliance can be adjusted at need before coming to the beards, in any direction, viz., vertical, horizontal or inclined. If desired, the looms are fitted up with a set of screw spindles which allow of the adjustment of the warping appliances easily and minutely even on the warp after it has been mounted. A set of screw spindles of

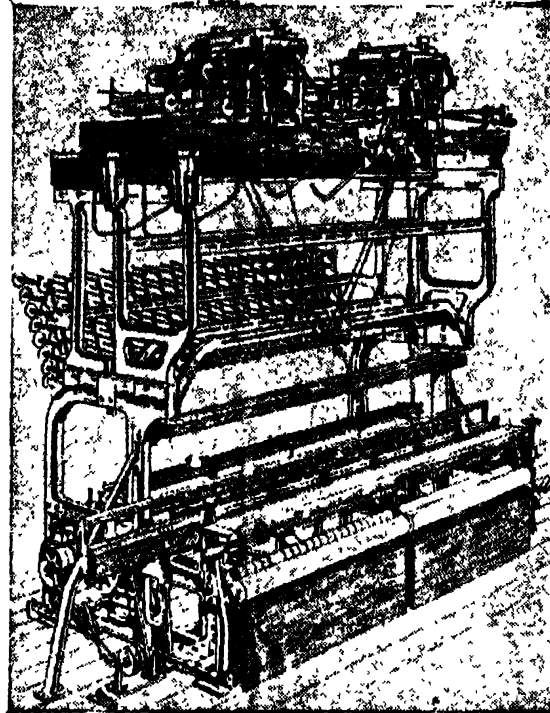
this kind generally suffice for a large number of ribbon looms.

According to the ribbons to be woven, the looms are provided with a take-up motion on either positive or differential system, and ordinary or special construction with precision advance for silk ribbons, etc. The same holds good for the appliance for winding the cloth directly or indirectly on to the cloth beam; the ribbons are wound on friction rolls or taken up in cases fixed underneath the loom, in front.

In order to impart an absolutely straight course to the batten, the looms are fitted up with batten arms giving a parallel lay motion.

The healds are mostly moved by a cam motion applied to one of the ends of the loom and actuated by the shaft, or by a dobby of 32 shafts with two pattern cylinders working alternatively. This dobby which is on the double-lift system, is provided with a lever with toothed segment, causing a stop of the shed at the moment when the shuttles are on their way. This is a very important device, the object of which is

to save the warp threads to a considerable extent.



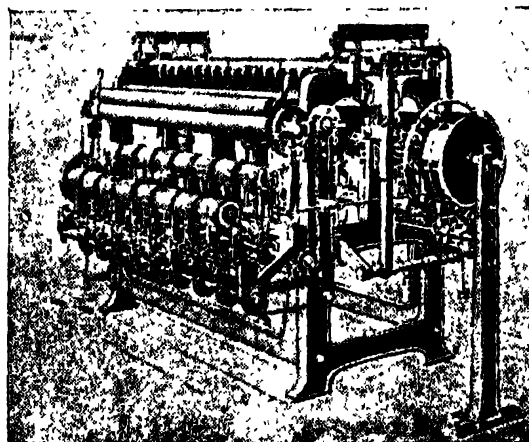
Jacquard Ribbon Loom,

is also the batten on which the superimposed rows of shuttles are placed.

The preparation of the warp and weft threads is done, in principle, under the same conditions as those of materials for ordinary looms, especially in regard to the winding and weft spooling. As regards

the warping, a warping machine of reduced width is adopted with advantage.

There are various qualities of ribbons, particularly silk ones, which, after being woven, require a certain amount of finishing, especially polishing on a machine which guarantees the best effects, together with a good output.



Silk Ribbon Polishing Machine.

Preparing Paints.

In the following article some valuable recipes for preparing paints, varnishes, painters' colours, drying oils, etc. are given in simple workable form calculated to materially assist the painters, designers, etc in their special line.

1. DRYING OILS.—To prepare for carriage, waggon, and floor painting. Take linseed oil 1 gallon, and add gum shellac 2 lbs., litharge $\frac{1}{2}$ lb., red lead $\frac{1}{2}$ lb., umber 1 oz. Boil slowly, 2 or 3 hours, until the gums are dissolved.

Grind your paints in this (any colour you like) and reduce with turpentine. Yellow ochre is used for floor painting. This dries quick and wears exceedingly well.

2. DRYING OIL, equal to the patent dryers.—Linseed oil 2 gallons, and add litharge, red lead, and umber, of each 4 ozs., and sugar of lead and sulphate of zinc, of each 2 ozs.

Boil until it will scorch a feather. Use this, or either of the others, in quantity to suit the object of the work being done.

3. JAPAN DRYER of the best quality. Take linseed oil 1 gallon, and put in gum shellac $\frac{1}{2}$ lb., litharge and burnt Turkey umber, of each $\frac{1}{2}$ lb., red lead $\frac{1}{2}$ lb., and sugar of lead 6 ozs. Boil in the oil until all are dissolved, which will require about 4 hours; remove from the fire, and add spirits of turpentine 1 gallon, and it is done.

4. ANOTHER.—Another dryer is made by taking linseed oil 5 gallons, and adding red lead and litharge, of each $3\frac{1}{2}$ lbs., raw umber $1\frac{1}{2}$ lbs. sugar of

lead and sulphate of zinc, of each $\frac{1}{2}$ lb.; pulverize all the articles together, and boil in the oil until dissolved; when a little cool, add turpentine 5 gallons, or to make it of a proper consistence.

OIL PAINT.—To reduce with water. Take gum shellac 1 lb.; sal-soda $\frac{1}{2}$ lb., water 3 pints, put all into a suitable kettle and boil, stirring until all is dissolved. If it does not all dissolve, add a little more sal-soda; this, when cool, can be bottled for use. If it smells bad when opened, it does not matter.

1. DIRECTIONS FOR USING. Mix up two quarts of oil paint as usual, except that no turpentine is to be used—any colour desired. Now put one pint of the gum shellac mixture with the oil paint when it becomes thick. It may be reduced with water to a proper consistence to lay on with a brush. Two coats will be required, and with the second coat sand may be applied, if required. The sand may be applied with a tube-like box, with a number of small holes to allow the even spreading of the sand, as with a pepper-box.

2. ANOTHER METHOD.—Take soft water 1 gallon, and dissolve in it, pearlash 3 ounces, bring to a boil, and slowly add shellac 1 lb.; when cold it is ready to be added to oil paint, in equal proportions. The expense of these is estimated to be only one-third of oil paint.

PAINT SKINS.—To save and reduce to oil.—Dissolve sal-soda $\frac{1}{2}$ lb., in rain water 1 gallon.

The skins that dry upon the top of paint, which has been left standing for any length of time, may be made fit for use again by covering them with the sal-soda-water and soaking them therein for a couple of days ; then heat them, adding oil to reduce them to a proper consistence for painting, and straining.

1. NEW TIN ROOFS.—Valuable process for painting.—Scrape off the rosin as clean as possible and sweep the roof ; now dissolve sufficient sal-soda in a bucket of water to make it quite strong ; wash the roof thoroughly with the soda-water and let it remain until it is washed off by the rains, or after a few hours, washing off with clean water, rinsing well. When dry give it one coat of pure Venetian red, mixed with one-third boiled, and two-thirds raw linseed oil ; the second coat may be of any desired colour. The soda-water dissolves the rosin remaining after scraping, destroys the greasy nature of the solder, and of the new tin, as there will be sufficient 'grip' for the paint to adhere firmly. The pure Venetian red is one of the most durable paints for metallic roofs, but is often rejected on account of its colour. The above mode of painting will set aside the difficulty.

2. FIRE-PROOF PAINT.—For roofs, etc.—Slake stone lime by putting it into a tub, and covering, to keep in the steam. When slaked, pass the powder through a fine sieve ; and to each 6 quarts of it add 1 quart of rock salt, and water 1 gallon ; then boil and skim clean. To each 2 gallons of this, add pulverised alum 1 lb. ; pulverised copperas $\frac{1}{2}$ lb.,

slowly add powdered potash $\frac{1}{2}$ lb. ; fine sand or hickory ashes 4 lbs.

Now add any desired colour, and apply with a brush. It looks better than paint, and is as durable as slate. It stops small leaks in roofs, prevents moss, and makes it incombustible ; and renders brick impervious to wet.

3. WATER-PROOF, OIL RUBBER PAINT.—Dissolve about 5 lbs. of India rubber in 1 gallon of boiled linseed-oil, by boiling. If this is too thick, reduce with boiled oil ; if too thin, use more rubber. This is specially applicable to cloth, but is valuable for any material.

FROSTED GLASS.—The frosty appearance of glass, which we often see where it is desired to keep out the sun, is done by using a paint composed as follows : Sugar of lead well ground in oil, applied as other paint ; then pounced, while fresh, with a wad of batting held between the finger and thumb. After this it is allowed to partially dry ; then with a straight edge laid upon the sash, you run along by the side of it, a stick sharpened to the width of the line you would like to appear in the diamonds, figures, or squares, into which you choose to lay it off.

ORIENTAL PAINTING.—The colours used are Prussian-blue, crimson, white, and yellow lakes, Rosseau, white zinc, and No. 40 carmine. (Druggists keep them in small tubes. They must be mixed with dammar varnish, rubbing with a table knife or spatula upon glass).

DIRECTIONS FOR MAKING VARIOUS SHADES OF COMPOUND COLOURS.—Proportion them as follows :—for green, $\frac{1}{5}$ blue, $\frac{4}{5}$ yellow

—purple, $\frac{1}{6}$ blue, $\frac{5}{6}$ crimson—orange, $\frac{1}{2}$ crimson, $\frac{1}{2}$ yellow—wine colour, $\frac{1}{12}$ crimson—pink, add a little crimson to white zinc—brown, mix a dark purple, and add yellow according to the shade desired—black, add crimson to dark green until the shade suits you. To make the compound colours lighter, add the lightest colour in it, and make darker by using more of the darkest colour in the compound.

FOR BACK-GROUNDS.—White, white zinc, or pink white with turpentine and boiled linseed oil and dammar varnish—Black, lamp-black, with asphaltum varnish and boiled linseed oil and turpentine in equal quantities—Flesh colour, white zinc with a small portion of crimson and chrome yellow to suit. For sketching out the figures on the ground-work, use a little lamp-black with asphaltum varnish, turpentine, and boiled linseed oil to make it flow freely.

DIRECTIONS FOR PAINTING.—Make your glass perfectly clean, and place it over the picture you wish to copy; then with a sketching preparation, trace on the glass all the lines connected with the figures of the picture which you are copying, being careful to sketch the lines, very distinctly; when the sketching is done and dry, proceed to lay on the back ground inside of the sketched lines until all the sketching is closed; and when the back-ground is dry, proceed to put on the colours, commencing with the green, if any in the figures, ending with yellow. When the colours are all laid, put the back-ground upon the remainder of the glass and when all is dry have tin foil

crumpled very much in your hand, and then partly straightened out, and lay it over the figure and keep it in its place by pasting paper over it in such a manner that it cannot slip away, letting the paper to cover the whole back of the glass, or a wood-back can be placed behind the glass. When all is complete it will look well or ill, according to the practice and taste of the painter.

2 FANCY GREEN.—Unscorched, pulverised coffee, put into the white of an egg will, in 24 hours, produce a beautiful green for fancy painting. This incidentally proves there is a poison in unbrowned coffee.

SKETCHING PAPER—TO PREPARE.—Bleached linseed oil, turpentine and balsam of fir, equal parts of each; mix. Have a frame of a little less size than the paper to be prepared, and apply paste or thick gum solution to one side and the outer edge of it: moisten the paper, in clean water and lay it upon the frame, and turn the outer part of the paper over the outside of the frame upon the paste there, which holds it firm; and when it becomes dry it is tight like a drumhead; whilst in this condition, coat with a brush saturated with the above mixture; three or four coatings will be needed, giving each one time to dry before applying the next. Only sufficient is needed to make it transparent, so that when you wish to sketch a rose or other flower or leaf, from nature, the paper can be placed upon it like the glass in the 'Oriental Painting'; then trace the lines and finish it up in the same way also, as there described, or that you may see

through it in taking perspective views of distant scenery.

DOOR PLATES—To make.—Cut your glass the right size, and make it perfectly clean with alcohol or soap ; then cut a strip of tin foil sufficiently long and wide for the name, and with a piece of ivory or other burnisher rub it lengthwise to make it smooth ; now wet the glass with the tongue, (as saliva is the best sticking substance) or if the glass be very large, use a weak solution of gum arabic, or the white of an egg in half a pint of water and lay on the foil, rubbing it down to the glass with a bit of cloth, then also with the burnisher ; the more it is burnished the better it will look ; now mark the width on the foil which is to be the height of the letter, and put on a straight edge and hold it firmly to the foil, and with a sharp knife cut the foil and take off the superfluous edges ; then lay out the letters on the back of the foil, (so that they could be read correctly on the front) by means of pattern letters, which can be purchased for that purpose ; cut with the knife, carefully holding down the pattern or straight edge, whichever you use ; then rub down the edge of the burnisher, which prevents the black paint or japan which you next put over the back of the plate, from getting under the foil ; having put a line above and one below the name, you may insert a border round the whole plate or not, according as you bargain for the job. (The japan is made by dissolving asphaltum in just enough turpentine only with a brush as a back of the letters

and over the glass, forming a background. This is used on the iron frame of the plate also, putting it on when the plate is a little hot, and soon as it cools coating is dry. A little lamp black may be rubbed into it if you desire

If you choose, you can remove every other foil letter, after the japan is dry, and paint in its place, red, blue, or any other coloured letters, to make a greater variety out of which your customers may choose, the design they desire you to follow in getting up their plate. The foil being thicker than silver or gold foil, will not show the paint through it in little spots as they do ; but if these foils are desired to be used, you can put on two thicknesses by proceeding as follows, which will then prevent the paint from showing through them. Lay on the first coat of these foils the same way as directed for the tin foil, and smooth it down by rubbing on the front of the glass ; then breathe on it until a dampness is caused ; now put on a second and burnish well, having paper over it ; but instead of the knife to cut around your pattern or straight edge, take a sharp needle, using the point, make lines through the leaf around the pattern letter or straight edge ; then with a bit of jeweller's wood, or other hard wood, made to a narrow and sharp point, remove all up to the lines, both in and around the letters, as these foils have not the substance to peel off as the tin foil, then japping over them the same way as the other letters. Paper letters can be cut of advertisements, put on by wetting the glass in the same way as for the foil, japping over them,

and when dry, removing them and painting the places out of which they came with various colours as desired, as the japan will not peel, but makes a sharp and distinct edge ; and these painted letters look well in this way ; and by taking advantage of printed letters are saved the skill and time necessary to form them.

TO ILLUSTRATE.—A may be gold foil ; W will be blue, G red, H black, A gold foil, S blue, E red, M black, and again D gold foil, which will make a more showy plate than if all were of one foil, or one colour.

Set your glass in a frame with putty, and put a tin coat of putty over the whole plate, as the plaster of paris filling which is generally used soon eats out the japan or paint, and spoils the job. Shellac varnish coloured with lampblack is good in place of the japan.

ETCHING AND GRINDING UPON GLASS.—For signs or side lights.—Take Asphaltum Varnish, and with a small pencil lay out the names or designs, not putting the varnish upon the letters, but around them, leaving the space which the letters of the sign are to occupy, free and clear. When the varnish is dry have some beeswax melted and as it begins to cool take some of it up with a knife and scrape it off from the edge of the glass (to be etched) so as to form a wall to hold the acid upon the glass while etching : now lay the glass flat and pour a little fluoric acid on the name, letter, or design thus prepared, and let it remain on it for one hour, not allowing the glass to be touched or moved during that time ; then pour of the acid into the bottle, and it can be used again. The asphalt prevents the acid from eating or etching only the letter, and the wax wall prevents the acid from flowing off and being wasted. When the acid is poured off wash the glass with a little water, scrape off the wax and remove the

asphalt with a little turpentine, and all is done.

The above directions are for plain glass ; but if you desire, you can gild the letter which is etched or you can gild except the letter, if desired.

If it is desired to etch upon druggists' or other jars, it can be done by preparing the name to be put on, with varnish or wax ; then have a lead box without top or bottom ; shape on the lower edge to fit the shape of the jar and press this down upon the wax to make it tight ; then pour your acid into the box which keeps it in its place the same as the wax does on a flat surface. Ornaments and flourishes can be put on as well as letters.

2. GLASS GRINDING FOR SIGNS, SHADES, ETC.—After you have etched a name or other design upon uncoloured glass, and if you wish to have it shown off to a better advantage by permitting the light to pass through the letters you can do so by taking a flat brass sufficiently large not to dip into the letters, but to pass over them when gliding upon the surface of the glass ; then with flour of emery, and keeping it wet, you can grind the whole surface very quickly, to look round like the ground glass globes, often seen upon lamps, except the letter which is eaten below the general surface

3. FLUORIC ACID, TO MAKE FOR ETCHING PURPOSES.—You can make your own fluoric (called hydro-fluoric) acid by getting the fluor, pulverizing it and putting all of it in sulphuric acid, which the acid will cut or dissolve.

This acid is put into gutta-percha bottles, or lead bottles, and must be kept in them when not in use, having corks of the same material. Glass, of course, will not hold it, as it dissolves the glass, otherwise it would not etch upon it.

PAINTERS' ECONOMY IN MAKING COLOURS.

1 Prussian Blue.—(1st) Take nitric acid, any quality, and as much iron shavings from the lathe as the acid will dissolve; heat the iron as hot as can be handled with the hand; then add to it the acid in small quantities as long as the acid will dissolve it, then slowly add soft water double the quantity of acid, and put in iron again as long as the acid will dissolve it.

(2nd.) Take prussiate of potash, dissolve it in hot water to make a strong solution, and take sufficient of it with the first to give the depth of tint desired, and the blue is made.

2 ANOTHER METHOD.—A very passable Prussian blue is made by taking sulphate of iron (copperas) and prussiate of potash, equal parts of each, and dissolving each separately in water, then mixing the two waters.

3 Chrome Yellow.—(1st.) Take sugar of lead and Paris-white, of each 5 lbs., dissolve them in hot water.

(2nd.) Take bichromate of potash $6\frac{1}{2}$ ozs., and dissolve it in hot water also, each article to be dissolved separately, then mix all together, putting in the bichromate last. Let it stand for 24 hours.

4 Chrome Green.—Take Paris-white $6\frac{1}{2}$ lbs., sugar of lead, and blue vitriol, of each $3\frac{1}{2}$ lbs., alum $10\frac{1}{2}$ ozs., best soft Prussian blue and chrome yellow, of each $3\frac{1}{2}$ lbs. Mix thoroughly while in fine powder, and add water 1 gallon, stirring well. Let it stand 3 or 4 hours.

5 Green, Durable & Cheap.—Take spruce yellow and colour it with a solution of chrome yellow and Prussian blue, until you give it the shade you wish.

6 Paris Green.—Take unslaked lime of the best quality, slake it with hot water; then take the finest part of the powder and add alum water, as strong as can be made, sufficient to form

a thick paste, then colour it with bichromate of potash and sulphate of copper, until the colour suits your fancy.

N. B. The sulphate of copper gives the colour a blue tinge—the bichromate of potash a yellow. Observe this and you will never fail.

7 ANOTHER METHOD.—Blue vitriol 5 lbs., sugar of lead $6\frac{1}{2}$ lbs., arsenic $2\frac{1}{2}$ lbs., bichromate of potash $1\frac{1}{2}$ ozs.; mix them thoroughly in fine powder, add water 3 pints, mixing well again and let it stand 3 or 4 hours.

8 Pea Brown.—(1st.) Take sulphate of copper, any quantity, and dissolve it in hot water.

(2nd) Take Prussiate of potash, dissolve it in hot water to make a strong solution; mix well the two solutions, as in the blue, and the colour is made.

9 Rose Pink.—Brazil wood 1 lb., and boil it for 2 hours, having 1 gallon of water at the end; then strain it and boil alum 1 lb in the same water until dissolved; when sufficiently cool to admit the hand add muriate of tin $\frac{3}{4}$ oz. Now have Paris white, $12\frac{1}{2}$ lbs., moisten up to the consistency of thin paste and when the first is cool stir the two thoroughly together. Let it stand for 24 hours.

When any of the above mixtures have stood as mentioned in their respective recipes, all that is necessary is to drain off the water by placing the preparations into muslin bag for that purpose, and then exposing the mixture to the air, to dry for use.

Glass, stone, or wood vessels only should be used, as the acids soon work upon iron, tin, copper, etc., resulting in a tinge not desired in the colour. Always observe that if water is to be mixed with strong acids, it must be added slowly, specially if in light phials, or the vessel will be broken by means of the great heat which is set free by the combination.

Paper Manufacture.

THERE are altogether 2 paper mills in India employing more than 5,000 labourers. Of these 1 are in Bengal, 3 in Bombay, 1 in Burma, 1 in Madras, 1 in U. P. Statistics for the year 1922-23 show that paper and paste-board of the quantity of 1,206,932 cwts. valued at Rs. 2,78,66,735 and 180,255 cwts of paper making materials valued at Rs. 24,25,827 were imported into India. These figures will indicate the

great discrepancy between production and consumption showing incidentally the prospects for paper manufacture in this country.

Again, during 1922-23 606 cwts. valued at Rs. 17,205 of paper and paste-board of Indian manufacture were exported together with 100 cwts of paper making materials valued at Rs. 1,251.

In the absence of proper records it

has been surmised that the total annual production of paper from the Indian mills on an average are as follows :

Year	Tons
1900-14	32,000
1915-19	25,000
1920-24	32,000

It has been also estimated that the total Indian demand for paper of all kinds was 20,000 tons annually.

The three main stages in the manufacture of paper are cellulose, pulp and paper. Cellulose is furnished by cotton,

grass, or such other fibrous substances. Generally speaking, rags constitute the basic material in many of the printing papers. These usually arrive at the mill in huge bales. They are first run through the dusting machine where all loose dirt is freed from them. The loose rags are then distributed to heavy wooden boxes with screens of coarse wire in the bottom, where sorters separate the silk and wood from the linen and cotton goods. They also

remove the buttons and other attachments.

All cotton linen materials are next graded and put in baskets to be used for different grades of paper.

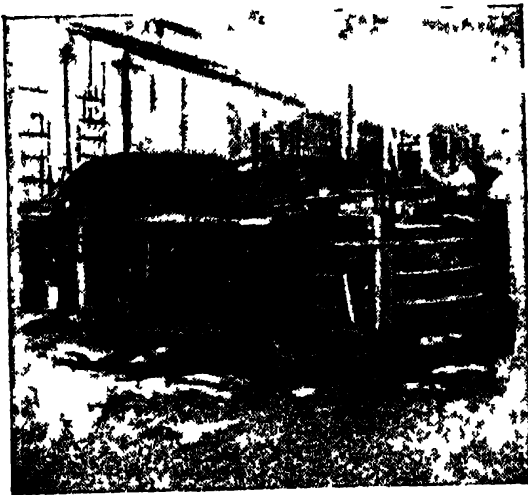
On the way to the steam cooker the rags are shredded in a machine and then dumped into a great steel digester where they are cooked in live steam to remove all impurities and foreign matter. Here they are also bleached by means of chemicals. From



Sorting Rags.

the digesters rags are taken to the beaters where the ingredients for making the paper are dissolved in solution of water. These powerful beaters mix the raw material with bleach, colour, sizing, etc.

At the next part of the mill a drum revolves at an extremely great speed. This is set with knives which pass between corresponding knives in a fixed plate built into the bottom of the tank. When the wood pulp or rag stock are passed between these two sets of knives the fibres are drawn out, softened and separated.



Treating with Chemicals

Indeed the mass becomes thoroughly disintegrated. After the beating process the pulp is thinned still more to a milky liquid with over 90 per cent water.

From the beater the watery pulp enters the "stuff" chests directly above the "wet end" of the paper machine. Here it is further diluted, thoroughly agitated, passed through an adjustable gate which determines its weight when finished and permitted to flow out on a "wire." This wire is an endless copper screen which is being constantly vibrated to interlace the fibres firmly and uniformly. As the stock passes along the wire some of the water escapes through the perforations and much of the water is sucked out by compressed air as the wire passes over a suction box.

The dandy roll is a part of the wet end of the paper making machine. It is a brass-screened cylinder extending across the entire width of the "wire." The axis is held in perpendicular grooves, permitting the entire weight of the dandy roll to come in direct contact with the partly dry pulp on the wire. Just before the wet sheet leaves the wire it passes under the dandy roll. Here the water mark design leaves its imprints upon the paper.

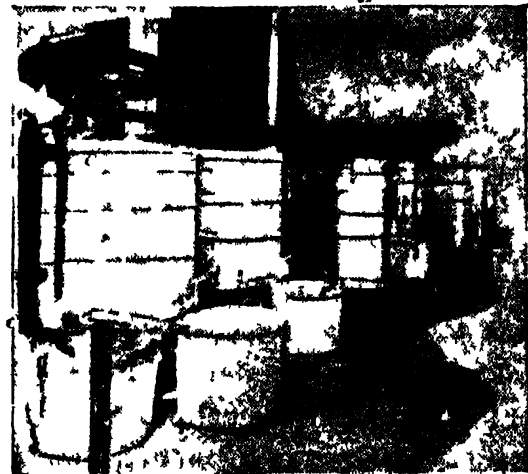
As the stock travels over and under two long napped pure wool "felts" any slight traces of the screen pattern are brushed out leaving only a greater

density of texture where the water marks have been imprinted. From the second press roll the paper is carried on to the "dryers", a series of steam-heated hollow steel cylinders.

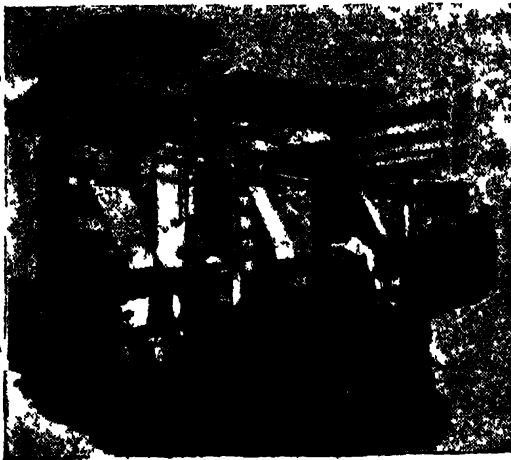
This paper passing through these "dryers" is held smooth and tight by huge canvas belts. It follows this canvas belt over the top cylinder, under the bottom and so on through the "dryers." The wet sheets of fragile fibre is here transformed into a strong sheet of paper. It is now ready for its surface finish.

Machine finish book papers are finished on the paper making machine itself. The sheet is carried from the "dryers" to the calenders or "stacks". These are stocks of solid steel rolls turning at a greater rate of speed than the "dryer" cylinders. As the paper threads its way back and forth through the "stacks" the high rate of speed and the enormous weight of the rolls produce the desired surface finish. When paper is not to be finished on the paper making machine it is run through a limited number of calender rolls and wound on a large roll, ready for the next step.

The ingredients of the coating to be applied to enamelled papers are mixed in large vats. The body of most of the enamels is pure white china clay. Casein is mixed with the body of clay and then this is coloured and diluted



Paper Pulp



Paper Making

to about the consistency of smooth cream. The mixing is effected by means of agitators.

This creamy liquid is drawn from the vats and carried in vessels to the machines, which automatically spread it uniformly over the surface of the basic stock. The spreading is done with long, soft-haired brushes which are continually moving back and forth. Paper is fed into the coating machine directly from the roll as it comes from the paper machine.

After the liquid enamel has been applied, the paper is mechanically draped in festoons and carried back into a drying chamber. Here hot air is blown between the sheets: the coating becomes dry and firmly set. By this time the paper reaches the rewinder where it is again wound into rolls.

When the roll of rough paper comes from the coating machine its surface looks like blotting paper. The rich beauty and smooth clay finish is brought about by what is known as the super-calender. This is a stack of rolls run by contact with the lower roller which is operated by power. The steel rolls of the super-calender alternate with rolls of solidified cotton or paper. The paper is wound off from the upper reel, threading back and forth through the rolls and winding upon the lower reel. Owing to the friction contact the rollers slightly decrease in speed from

bottom to top and this friction, together with the tremendous weight of the rolls and the combined weight leverage, produces a glossy, hard finish where the rough coated surface existed. Uncoated book papers are calendered in much the same way as the coated paper is finished. The wide difference in texture and quality between coated or uncoated book papers and bond or off set papers lies in the pulp preparation: The use of a "filler" in manufacturing finished printing papers gives the calenders a substance on which to work in producing lustre. Some papers are required to be sized: the sizing is a chemical mixture consisting largely of rosin.

Cutting rolls into sheets is a process accomplished after manufacturing and finishing are completed. The rolls are then loaded on a series of trestle work. These rolls are suspended by means of and rotated upon heavy steel shafts, the ends of which are secured in bearing with adjustable friction clamps. The paper from each of the rolls is drawn together between two contact rollers and thence over the stationary cutter knife. After the paper is cut into sheets, some of this is counted and packed without further work. All coated papers are sorted by hand, blemished sheets being thrown out. They are also trimmed. The purpose of trimming is to make all sheets exactly the same size, with corners perfectly square.



Finishing.

These two metals unite readily in any proportions, the union being attended with evolution of heat which in some cases is very large in amount. The alloys of aluminium with copper show very different properties according to the quantities of aluminium they contain. Alloys containing but little copper cannot be used for industrial purposes. With 60 to 70 per cent of aluminium they are very brittle, glass-hard, and beautifully crystalline. With 50 per cent the alloy is quite soft, but, under 30 per cent of aluminium the hardness returns. The usual alloys are those of 1, 2, 5, and 10 per cent of aluminium, such alloys being known as aluminium bronze.

Alloys of copper and aluminium are conveniently made by the use of a hardener of 50-50 copper and aluminium. This alloy can be purchased ready made or be made up in the foundry requiring it. This 50-50 hardener is simply charged with the ingot aluminium and both are melted together, then thoroughly stirred.

Rum from Molasses.

151 H. N. Sethi. Writes 'Please describe the process of making rum from molasses.'

In making the best rum, molasses or treacle is used, this being the uncrystallisable sugar that is left after extracting cane sugar from the juice of the sugar cane. The skimmings from the sugar that are taken during concentration are mixed with equal quantities of water and the lees from previous fermentation, and placed in a covered vat, in which

fermentation begins in about twenty-four hours without the addition of yeast, as the yeast spores are contained in the lees, and fermentation is helped by the hot climate; molasses are added as the fermentation proceeds. The fermentation usually occupies about three or four days, but sometimes longer. Rum is colourless when distilled, but is artificially coloured subsequently, and sometimes flavoured by the addition of pineapples, raisins, etc.

Candle Making.

194 Meeran Mohideen Ravuttherin. Asks "how candles are made?"

Common wax candles are made from paraffin wax, which has a low melting point (100°F to 130°F); this is usually mixed with 5 per cent or 10 per cent of stearic acid, to prevent the candles bending. The better qualities of wax candles are made from a similar material called ceresin—derived from the mineral known as ozokerite—which has a higher melting point, (140°F to 170°F), while the best kinds are made from spermaceti. The wicks are made from cotton specially spun for the purpose; they are pickled in a bath of boric acid 1 part and water 100 parts, and after removal from the solution are dried in a steam-heated chest and then wound upon bobbins. The candle-making machine consists of a number of metal moulds fixed in a water-box; below the moulds there is an equal number of pistons, which can be raised or lowered by means of a handle at the side of the machine. The pistons are hollow, and below each piston is a

Bobbin of wick, revolving on an iron pin; the wicks are drawn up through the pistons, and are then supported so as to be quite central in the latter. The tops of the candle moulds are all flush with a shallow tray which forms the top of the water-chest. A pipe at the side having a T-joint serves to supply hot or cold water to the chest, as may be required, while at the opposite side there is an overflow pipe. In addition to the machine there is a frame containing a number of clamps, there being a handle at the side which opens simultaneously the whole of these clamps. The wax is melted down in a steam-jacketed pan, a canful being taken out and poured into the tray, from whence it reaches the moulds. The water in the chest is at first warm, but it is gradually cooled by the addition of cold water until the wax solidifies; the wicks are then cut, and the excess of wax is removed from the tray by means of a scraper. The frame of the clamp is now placed over the machine, and the handle at the side turned; this forces up the pistons, and ejects the candles into the clamps. The candles are left in this position while another lot is moulded, because they serve to hold the wicks in the proper positions, so that there is no further need to adjust them; when the second lot of wax has solidified, the wicks are cut and the frame of clamps holding the candles is removed. The stearin used by candle-makers is really a mixture of stearic acid and palmitic acids obtained from tallow. For candle-making, the stearin is usually mixed with about 5 per cent of paraffin wax, to prevent it crystallising.

To Clean Gold Lace.

3210 Ramesh Chandra Gupta.
Asks how to clean gold lace.

Lay the lace smooth on a woollen carpet or piece of woollen cloth, and brush it free from dust, then burn rock alum and powder it fine, and afterwards sift it through a fine sieve; then rub it over the lace with a fine brush, and in so doing it will take off the tarnish and restore it to its brightness, if it be not too much worn on the threads.

Metal Polishes

114 Kamruddin.—Please give us recipe of metal polish both powder and liquid.

(1) Liquid Metal Polish. Kieselguhr, 56 lb; paraffine oil, 3 gal; alcohol 1½ gal; camphorated spirit, ½ gal; turpentine oil, 1 gal; liquid ammonia fort., 3 pt. Pour the ammonia into the oil, alcohol and turpentine, add the camphorated spirit, and mix with the kieselguhr. To prevent setting, keep well agitated during filling. The colour may be turned red by using a little sesquioxide of iron and less kieselguhr. Apply with a cloth, and when dry, use another clean cloth, or a brush.

(2) Powder Metal Polish. Kieselguhr, 42 lb; patty powder, 14 lb; pipeclay, 14 lb.; tartaric acid, 1½ lb. Powder the acid, mix well with the others. It may be tinted with 12 oz of oxide of iron, if desired.

Contact-Gilding.

221 Amrit Lal B. Soni.—Writes, "Will you kindly explain the process of contact-gilding?"

In this process, a solution is made by adding chloride of gold to a solution of cyanide of potassium: in this the articles to be gilt are placed, in contact with a piece of zinc, which sets up electro-chemical action, by which the gold becomes reduced upon the zinc, the process would not be one to recommend on the score of economy. In some cases, however, in which it is necessary to deposit a film of gold upon some portion of an article which has *stripped* in the burnishing, a cyanide solution of gold may be dropped on the spot, and this touched by a zinc wire, when it will receive a slight coating of gold, and thus save the necessity of regilding the whole article.

Artificial Slate.

3447 Sbambhu Nath Bhattacharya—Wines "Please describe how artificial slate is prepared."

The artificial slate coating on tin consists of a mixture of finely ground slate, lamp black, and a water-glass solution of equal parts of potash and soda water glass (1.25 specific gravity). The process is as follows. First prepare the water-glass solution by finely crushing equal parts of solid potash and soda water glass and pouring over this 6 to 8 times the quantity of soft river water, which is kept boiling about 1½ hours, whereby the water glass is completely dissolved. Add 7 parts finely crushed slate finely ground with a little water into impalpable dust, 1 part lampblack, which is ground with it, and grind enough of this mass with the previously prepared water-glass

solution as is necessary; for a thick thin coating with this compound plates are painted as uniformly as possible. For roofing zinc plate may be coloured in the same manner. The coating protects the zinc from oxidation and consequently from destruction. For painting zinc plate, however, only pure potash water glass must be added to the mixture, as the paint would loosen or peel off from the zinc if soda water glass were used.

Soda Manufacture By Le Blanc.

3601 M. N. Kusshesthi.—This process consists in melting together sodium sulphate (salt cake), coal, or coke, and limestone or chalk when the sulphate is reduced by the carbon to sodium sulphide, which then reacts with the calcium carbonate (chalk, limestone) to yield sodium carbonate.

The calcium sulphide formed is insoluble in water, so that in order to isolate the sodium carbonate all that is necessary is to lixiviate the mass with water. In practice a considerable excess of limestone and coal is employed, so that much free calcium oxide is formed. When this mass is slaked with water calcium hydroxide is formed with the evolution of heat which then reacts on the sodium carbonate to produce caustic soda. This procedure greatly aids the rapid lixiviation of the mass with water.

Watch Makers' Oil.

3417 Kbitish Ch. Roy Choudhury. Requires a formula of watch makers' oil.

Stir up for some time best olive oil with water kept at the boiling point; then after the two fluids have separated, decant the oil and shake up with a little freshly burned lime. Let the mixture stand for some weeks in a bottle exposed to the sunlight and air, but protected from wet and dirt. When filtered, the oil will be nearly colourless, perfectly limpid, and will never thicken or become rancid.

Re-inking Typewriter Ribbons.

3415 Vupputuri Narasimha & Son. Ask how to re-ink used up type writer ribbons.

Take benzine, petroleum, rectified oil of turpentine, vaseline, powdered drop black, aniline dyes, (any colour). Over a light fire melt vaseline of a high boiling point. When melted stir in as much powdered drop black or lamp black as it will take up without appearing grainy. Too much fat will make the ribbon greasy. If too much colour, is used the ribbon will be smeary. Be careful to bring mixture to the proper consistency and then take from fire.

In a room where there is no fire or flame, take equal parts of rectified oil of turpentine, benzine and petroleum in which the fatty ink should be dissolved by adding small portions at a time and constantly stirring. When completed the ink should be of about the consistency of fresh paint.

The greatest care must be taken to the actual inking of the ribbon, for otherwise everything will be spoilt. A very good way is to take a piece of card-board and cut into the shape of the

card-board spools on which fine darning cotton is sometimes wound; then carefully and evenly shape and wrap the old typewriter ribbon on this. Then take a level board, with hard, even surface and unwinding a little of the ribbon at a time apply the freshly-stirred ink with a soft paint brush. An old paint brush may be utilized to rub the ink well into the ribbon, so that but very little appear on the outside. If the original colour is desired, prussian blue, red lead or any aniline colour may be used.

Another ink may be made by dissolving one part of aniline black to three parts of alcohol, adding glycerine and colouring to suit.

Potato Preserving.

43 Abhayapada Mallik. Requires hints on preserving potatoes.

Put the potatoes in baskets and boil water in a large vessel. The basket containing the potatoes is then dipped into the boiling water for a minute or two. Then the potatoes are dried on a warm oven and laid up in sacks. The sacks are kept in a dry place. Thus potatoes can be preserved for a considerable time at a moderate cost.

Coconut Butter.

284 K. P. Kankarya. Wants to prepare coconut butter.

The dried copra is sliced, and the fat is extracted by oil presser which is quite a simple process. The oil contains free acids as well as bad odours. This oil is placed in a tank and powdered chalk is added to it. The free fatty acid is absorbed by the powdered chalk.

The chalk settles down ; when it is settled clear oil is filtered for four of five times. This oil is taken into another tank and heated by steam coil to about 270°C. This process is continued until the oil is clear and begins to bubble. In this process the bad smells will be removed. It is then pumped into an automatic weighing apparatus and run into moulds, where it is allowed to cool. Heating in the open fire will spoil the whole mass.

Luminous Paint.

88 Balmokand Sethi. Wants a recipe of luminous paint.

The luminous mass consists of 4 parts of potassium bichromate, 4 of gelatine, and 50 of calcium sulphide. The constituents are thoroughly dried and mixed by grinding. One part of the resulting powder is stirred with 2 parts of boiling water to a thickly fluid paint, 1 or 2 coats of which are applied with a brush.

Limejuice Cordial.

3499 V. O. K., Travancore. Writes, how limejuice cordial is prepared.

Take boric acid $\frac{1}{2}$ oz. ; citric acid, 2 oz. ; sugar, 3 lbs. ; water 2 pts. Dissolve by heat. When cold add lime juice, 30 oz. ; tincture of lemon, 2 oz. ; water to 1 gal. Mix and colour with caramel.

Toilet Soap.

3543 P. K. R., Calcutta. Requests us to publish process of manufacturing toilet soap.

Tallow 40 lbs. and olive oil 15 to 20 lbs. are saponified with soda lye by

19°B. the soap next treated with a lye of 15°B. and lastly with a lye of 20°B, and the operation is conducted as for curd soap, but no excess of alkali must be used. When boiled clear, the soap is left in the pan for 6 or 8 hours ; it is next completely separated from the lye and is then placed in a flat mould, and pressed until it no longer exhibits any flux, to prevent it from mottling. To the above proportions the following perfumes are added :—oil of cumin, 10 ozs., oil of bergamot, 6 ozs., oil of lavender, 3 ozs., oil of origanum, 1 oz., and oil of thyme, 3 ozs.

Red Glass.

3589 B. D. S. C., Baraset. Writes, how red glass is prepared.

Red glass may be made with either gold or copper as the colouring agent. An extremely small proportion of gold is necessary, and it is commonly understood to be in the form of a colloidal suspension of the metal. One of the best methods of preparing gold ruby glass is to precipitate the gold with colloidal stannic acid, and to add this to the glass. A yellowish glass is usually formed at first, but on reheating it turns to ruby ; the heating must then be stopped, as prolonged or excessive heating spoils the colour. Copper red glasses are of several kinds. The best results are obtained with a flint glass to which a small proportion of cuprous oxide, a little stannic oxide, and a reducing agent are added. The glass produced is almost colourless, but its colour is developed by reheating in a muffle,

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of COMMERCIAL INDIA are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

18 K. Rama Moorthy. For porcelain jars write to Calcutta Pottery Works Ltd, 45, Tangra Road and Gwalior Potteries Ltd, 2A Radhaprasad Lane, Sukea Street; both of Calcutta.

19 Aya Singh Vaid. Formulas of silvering glass appeared in July, 1922 and March, 1923 issues of INDUSTRY. For optician's tools enquire of Stephens & Co., 275, Bowbazar Street, Calcutta. For industrial books write to Thacker Spink & Co., 3, Esplanade East, Calcutta.

21 Chaturbhuj M. Bhatt. Process of preparing a duplicator appeared in June 1924 issue.

22 C. H. Ramamurthy & Sons. The Art of Soap Making by Watt is perhaps the best of all the books mentioned by you. You may start a soap factory on a small scale with Rs. 10,000 as a starting capital.

23 P. N. Sanyal. To hasten the time of refining, filter through flannel. Orris root is the root of the *Iris pinnatifida*, a plant extensively grown in Tuscany. It is now chiefly used in perfumery. It has the pleasant smell of violets. Istambal kahi is also an indigenous product used in perfumery for enhancing the flavour.

24 J. M. N. Kulshresth. Your enquiry appeared in February, 1925 issue, page 545, under No. 2983. Oil engines may be had of B. D. Bery & Co., 43, Ripon Street, Calcutta.

26 K. P. Datta Gupta. For disposing of the articles manufactured by you advertise in the pages of newspapers and periodicals.

27 Illegible. Process of manufacturing mantles appeared in February 1922 issue. A good recipe of bar soap appeared in August 1921 issue.

28 K. P. Bhargava. Chemicals you require may be had of B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta. Your other query is not in our line.

29 Niranjan Nath. One pound is now quoted at 200,770,00 marks.

30 G. C. Day. You may communicate with the Association of Manufacturing Chemists Ltd., 14-17 Halborn Viaduct, London E. C. 1 and Allen (Stafford) & Sons Ltd, Cowper Street, Finsbury, London E. C. 2.

31 C. C., Shah. Gypsum when heated in the air begins to lose its water at 100°C. and the loss is not complete till the temperature reaches 132°C. It is used for architectural purposes, in the nature of vases; as a manure; for making casts of objects. For selling gypsum correspond with Calcutta Mineral Supply Agency, 31 Jackson Lane, Calcutta who will give you the current quotation.

34 R. R., Ramta. Vide No. 3626.

35 Pyara Singh. For motor cars and lorries write G. McKenzie & Co. Ltd., 208, Lower Circular Road; French Motor Car Co. Ltd., 234-3, Lower Circular Road; Ailenbury & Co. Ltd., 24, Park Street; A. Milton & Co. Ltd., 156, Dharamtale Street and Ford Motors Ltd., 110-1, Russa Road North; all of Calcutta.

37 Bhagat Ram Sukala. For kerosene oils write to Standard Oil Co. of New York, 101-1, Clive Street and Asiatic Petroleum Co. Ltd., 9-4, Clive Street; both of Calcutta. Matches are manufactured by Amrit Match Factory, Bilaspur, Kota; Guha's Lucifer Works, 23, J. Paikpara Raja Manindra Street, Paikpara, Calcutta; Bandemataram Match Factory, Ballygunge, Calcutta; Zeo Match Factory, Rajgangpur, Chai-bassa, Cuttack Dist.. The follow-

ing are some of the paper mills of India: Bengal Paper Mills Co. Ltd., 103, Clive Street, Calcutta; Titaghar Paper Mills Co. Ltd., Chartered Bank Bldgs., 4, Clive Street, Calcutta. Girgaum Paper Mills, 77-9, Apollo St., Bombay; Upper India Conper Paper Mills Co. Ltd., Lucknow and Deccan Paper Mills Co. Ltd., 561, Bhawani Peth, Poona. Stationery goods may be had of Nilmoney Halder & Co., 106, Radhabazar Street; Dass & Co., 60, Sikdar Bagan Street and M. R. Day & Bros., 29, Radhabazar Street, all of Calcutta. A review of the manufacturing industries of India will be found in April, 1923 issue.

39 Kanai Lal Shaw. The following is a list of litho printers of Germany; (1) C. L. Keller, Brandenburgstrasse, 43, Berlin; (2) Theodor Jan, Posdanerstrasse 6123C., Berlin; (3) R. Rodger, Maxstrasse 6, Dresden; (4) C. Creutzburg, Arnoldstrasse 6-7, Dresden; (5) F. A. Bröckhans, Querstrasse 15, Leipzig; (6) Louis Glaser, Krenzstrasse 20, Leipzig and R. Kathmann & Co., Elsenstrasse 25-29, Leipzig. The above firms also print calendars.

40 Deviam Hiranman Bhavsar. Chemicals you require may be bought of B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta. Indigo is a vegetable dye obtained from leaves of indigo plant. It is soluble in water. Indigo may be bought of G. R. Singh & Co., Guntur; Giridharidas Radhakrishnas, 11, Mint Street, Madras; Nilmoney & Sons, 53, Monohar Dass' Chuk, Barabazar, Calcutta and M. M. Ispahani & Sons, 51, Ezra Street, Calcutta. Please explain clearly your other query regarding Blankite.

41 D. R. Bharadwaj. In keeping milk warm for a day you will have to keep it in vacuum bottle especially prepared for this purpose. The process of constructing such bottles will appear in an early issue.

42 S. D. Swamy. For books on photography enquire of Thacker Spink & Co., 3 Esplanade, East, Calcutta. Lenses used in cameras may be sup-

plied by Calcutta Camera House, Chowringhee, Calcutta.

43 J. A. Dixon. Stoppered glass phials may be had of C. K. Das & Sons, 17 College Street, Calcutta.

44 Lal Singh Chand. For unbreakable states try Sigh Sarkar & Co., 125 Harrison Road and Nilmoney Halder & Sons, 106 Radhabazar Street; both of Calcutta. American lanterns may be bought of Elliot & Co., 6A Clive Row, Calcutta. Chimneys may be had of Sarat Chandra Dass, 198-199 Old China Bazar Street, Calcutta. Lampwick will also be supplied by the above firm.

45 A. R. R. Luxman & Co. For labels and posters write to Calcutta Art Press, 287 Bowbazar Street; Calcutta Fine Art Cottage, 76 Dharamtola Street and Caledonian Printing Co., Ltd., 3 Wellesley Place, all of Calcutta. For tin boxes enquire of Rampratap Gujrand, 6 Harsi Bagan Road, Calcutta.

47 J. B. Garjar. Imitation jewellery may be supplied by P. Sovas & Co., 232, Upper Chitpur Road, Calcutta. Goldsmith's tool may be bought of A. J. Soor & Co., 233 Upper Chitpur Road, Bagbazar, Calcutta.

48 Rajabhai Bro. See No 3746 above.

49 V. T. Kulkarni. Put the *asava* in earthenware vessel for at least 2 months before using. This will lessen the fermentation to a certain extent.

O. P. K. Nair. For water pumps enquire of T. E. Thomson, 9 Esplanade East, Calcutta and Burn & Co., 7 Hastings Street, Calcutta. For spare parts of lamp enquire of Day & Co., 11-B Clive Street and Doorlay Chandra Mezmomdar, 194 Old Chinabazar Street; both of Calcutta. It is very difficult to detect the presence of undercurrent water without digging it.

51 Magan D. Vengatesan. Your query being in the nature of an advertisement should not be published in these columns.

52 **Josh** Magan Lall Bapujee. Pure copper, zinc and platinum may be bought of Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta.

53 P. M. Ukil & Sons. Coconut oil and til oil may be supplied by Anath Nath De. 3, Moidapatti, Bazar, Calcutta.

54 S. Vaidya & Co. To communicate with any querist write him with name and number under care of INDUSTRY when your letter will be duly re-directed.

56 Mehffay & Sons. For brushes try Bonner & Co., 20, Cornwallis Street and Indian Bristles & Lard Supply Co., 31/1, Tangra Road; both of Calcutta.

58 C. N. Arunachalam. Recipes of making mirror will be found in February, 1925 issue.

60 Jadab Ch Bhowmik. No further information on the subject is available.

61 M. B. Hussain. Liverpool twill, B. twill, cornsacks, etc. are special varieties of jute cloths and bags. For fuller treatment of these please go through January, 1925 issue of COMMERCIAL INDIA dealing with the subject of jute manufacture. May June, July-September quotations meant that delivery should be made during May and June and July and September and so on.

65 Daulat Ram Vidya Perkash Sud. For German novelties try Bore & Das Co., 28, Milmorey Mitter Street, Calcutta; Louis & Co., Big Bazar Rd., Trichinopoly; Mohamedbux Jivabhoj & Co., Nizam Street, Bombay No. 9 and M. L. Kakar & Co., Chhatta Bazar, Lahore. Your other enquiries are in the nature of advertisement therefore those should not be treated in these columns.

67 K Joseph de Silva. 24 ounces make one bottle; 16 drams make one ounce; 18 gramme is equal to 154 grains and 60 minims make one dram. From the above figures calculate the desired measure. The recipes you want will appear in due course.

68 B. J. Francis. You may make a roach poison which is practically

harmless to man by the following formula: corn starch 8 oz; powdered sugar, 16 oz; powdered quicklime, 4 oz; powdered borax, 4 oz. Have the ingredients thoroughly dry before mixing and preserve in air tight box. Scatter where the insects frequent, or use with powder blower. This is said to be quite efficient. On analysis Stephen's ink has been found to contain powdered galls 15 parts; calcium sulphate of iron, 5 parts; iron filings 4 parts; natural indigo, 1 part; concentrated sulphuric acid of sp. gr. 1.84 three parts; distilled water 200 parts. An article on phenyle manufacture appeared in October, 1921 issue. An article on roller composition will be found in January 1925 issue.

61 Suizumity Venkataji. Twisted yarn may be bought of Gokuldas Danodar Das, 57, Cross Street, Calcutta.

70 R. P. Garhwal. For the required machine try Oriental Machinery Supply Agency Ltd., 201, Dal Bazar Street, Calcutta. Formula of white lead appears elsewhere in this issue. For estimates of oil and flour mills write to Messrs Burn & Co., 7, Hastings Street, Calcutta. You will have to invest about Rs. 1000 for manufacturing glass from raw material.

72 N. Anbaram. Glass bottles may be supplied by Satva Churan Paul & Sons, 191, Old China Bazar Street; both of Calcutta. For leather capsules

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try B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. For German pictures enquire of Louis & Co., Big bazar, Trichinopoly.

73 D. P. Chatterjee. Wants a capitalist to invest in a profitable concern.

74 Sree Krishna Match Works. Process of making matches damp-proof appeared in August, 1924 issue. Recipes of pyrotechnic matches are not known. Match labels may be supplied by Bengal Small Industries Co., 91, Durga Charan Mitter Street, Calcutta.

75 P. V. Subba Sarma. Mix some lemon leaves when boiling the butter.

76 K. Narain. INDUSTRY is the only paper having wide circulation.

77 Sita Ram. Carbon rod is not manufactured in India. Carbon rods may be supplied by National Carbon Co., New York, U. S. A.

79 The Commercial Agency. There is perhaps no such machine. You may however try Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta.

81 N. C. Chakraverty. A series of articles on poultry raising appeared in January, February and March issues of 1925. You may enquire of U. P. Poultry Association, Royal Hotel, Naini Tal for particulars regarding poultry farm.

82 N. K. Sal. You may consult Soap and Allied Industries by H. Dutt to be had of the author at Datta Villa, Belgachia, Shambazar, Calcutta.

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BOMBAY.

83 Jethabhai Hemraj. You may go through July 1922 issue of INDUSTRY which deals exhaustively with match manufacture. Two persons you have mentioned will supply you the required information regarding machines.

84 The General Stores. For oil engines of required design try Jessop & Co., Howrah, and Burn & Co., 7, Hastings Street, Calcutta. Stationery articles may be supplied by Abdul Hussein Mohamedji, 180, Abdul Rehman Street, Bombay; Bombay Stationery Dept, 261, Abdul Rehman St., Bombay; Nilmony Halder & Co., 106, Radha Bazar Street, Calcutta, Dass & Co., 60, Sikdar Bagan Street, Calcutta, Bhargava Stationery House, Dareeba Street, Delhi and S. Chand & Bros., Chandni Chowk, Delhi. For dhunni machine and spinning wheel of improved type write to Khadi Pratishthan, 15, College Square, Calcutta. For addresses of order suppliers of different localities go through Sale and Exchange columns of INDUSTRY. Drugs and chemicals may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

86 Dr. Puvusottam Waman Tiloo. For the required apparatus try Economic Pharmacy, 84A, Clive Street, Calcutta. Process of preparing globules will appear in an early issue.

89 Abdul Matin Ahmedy. We do not deal in any article. For pictorial calendar you may enquire of Elliot & Co., 6A, Clive Row and Nihal Chand & Co., 1, Narayan Prasad Baboo's Lane; both of Calcutta. For mechanical books try Chakraverty Chatterjee & Co., 15, College Square and Thacker Spink & Co., 3, Esplanade East; both of Calcutta. For catalogues of sporting goods try S. Roy & Co., Esplanade and Car Mohalanobis, Chowringhee; both of Calcutta. An article on manufacturing shell buttons will appear in an early issue. For dyes used in textiles enquire of Calcutta Chemical Co., 35-1 Pandita Road, Ballygunge, Calcutta. You may correspond with Calcutta Industries Ltd., 71, Canning Street, Calcutta whether they can prepare required

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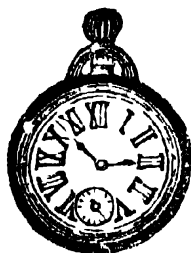
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machinery as per order. Recipe of cock-roach destroyer appears elsewhere in these columns.

90 R. P. Sinha. For particulars of the periodicals mentioned by you write them direct.

91 Shewakram Hargovindram. Write to the advertisers under care of INDUSTRY when your letter will be duly redirected.

92 S. C. Ghosh. There is no such book known to us.

93 Madan Pratap Gupta. Mix $1\frac{1}{4}$ pounds of sugar, 5 ounces of oil of lemon, and $\frac{1}{2}$ ounce of crystallized tartaric acid. Preserve the powder in air-tight bottles and dissolve in water and drink. For registration of patents, write to Registration of Patents, 1, Council House Street, Calcutta. Picture post cards may be supplied by P. J. Gallass & Cie, Rue Vignon 38, Paris, France and Photochemie G. m. b. H., N. Stolpischestrasse, 37, Berlin, Germany.

94 Head Master, Industrial School. For technical books enquire of Thacker Spink and Co., 3, Esplanade, East, Calcutta.

95 P. S. Jain. No such address is known to us.

96 Tulsi Ram. An article on snake bite cure appeared in August, 1921 issue. Wants to be put in touch with dealers in betel leaves and tobacco leaves.

97 H. Kappu Singh. Recipe of depilatory soap appears elsewhere in this issue. Consult physician.

99 M. Soleman. The process of refining oil consists in treating the oil with animal charcoal in the proportion of four to one by weight. Animal charcoal should be finely ground before it is mixed to the crude oil. The whole is put in a glass or china jar and covered over with a lid and is then exposed to the rays of the sun for 15 days successively. Impurities are absorbed by the charcoal and on filtering refined oil is obtained.

100 S. Modra. Sugar machinery may be bought of Cawnpore Engineering Works, Cawnpore. If you go through May 1924 issue of INDUSTRY you will get necessary information regarding sugar manufacture on a small scale.

101 Ganapatrao Korawan. Ice making plant may be had of Burn & Co., 7, Hastings Street, Calcutta.

102 G. P. Bhagat. Matches are manufactured by Bandemataram Match Factory, Pallygunge, Calcutta; Amrit Match Factory, Bilaspur, Kota; Sunderban Match Works, 12, Dalhousie Sq., Calcutta and Ananta Match Mfg. Co., Nazibabad. You may write to India Equitable Insurance Co. Ltd., 1, Lall Bazar Street; Himalaya Assurance Co. Ltd., 7, Bow Bazar Street and Royal Exchange Assurance, 1-2, Old Court House Corner; all of Calcutta for agencies. For small camera enquire of E. Solomon, 3, Kenderline Lane, Calcutta.

103 S. N. Chakraverty. For cycles try S. M. Bhattacharjee, 5, Dharamtala Street, Calcutta.

104 S. Shivasankara Iyer. For picture post cards see No 93 above. Other queries are not in our line.

105 Hanumanth. No such university is known to us.

106 Narendra Singh. An article on dry cell construction appeared in March 1924 issue. Formula of vanishing ink appears elsewhere in this issue. Process of dyeing silk will appear in an early issue.

107 Maung Foe. For industrial books enquire of Chakraverty Chatterjee & Co. Ltd., 15, College Sq., Calcutta.

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29-1, Telepara, Sampooker St., Calcutta.

108 Tata Ramasamy Chetty. For tennis balls enquire of S. Roy & Co., 4-7, Esplanade East, Calcutta; Sen & Seh, 1, Chowringhee Road, Calcutta; Alliance Trading Co., Karimpura, Sialkot and Imperial Sports Works, Greenwood Street, Sialkot. Scientific instruments may be supplied by Bengal Scientific Supplies Co., 29-30, College Street Market, Calcutta. Goldsmith's tools may be had of A. J. Soor, 234, Upper Chitpur Rd., Bagbazar, Calcutta. You may write to Calcutta Industries Ltd., 71, Canning Street, Calcutta for the required machine parts.

112 Indar Sen. For machines for *gota* write to Oriental Machinery Supply Agency Ltd., 1, Lall Bazar Street, Calcutta. For *gota* gold wire and silk thread necessary.

115 N. K. Mukherjee. For churning machine write to P. Lodge & Co., P. O. Box 6772, Calcutta.

117 Amjad Hussain. Tin boxes may be supplied by Curtis Henry, 17, Swan Street, London E. 1 and Jahneke Ltd., Dorset Street, Essex Rd., London N. 1. For fancy paper goods enquire of P. X. Richter, Frankfurt M. 9, Germany. Formula you have tried is a complicated one. You may however experiment the formula published in October 1923 issue.

118 Jai Singh & Brother. Your enquiry being in the nature of advertisement should not be published in these columns.

119 S. C. Datta Pramanik. A remedy to keep off mosquitoes, etc. is composed as follows: Cinnamon oil, 1 part; patchouli, 1 part; sandal oil 4 parts; alcohol, 400 parts. This has a pleasant odour.

120 C. K. Maduramuthu. Wants to be put in touch with dealers in swadeshi silk goods of Pithapuram and Karachi.

121 J. N. Bhan. Write direct to the heads of departments you have mentioned for securing a suitable job.

123 R. S. Krishnaier. To learn magical tricks only book knowledge will accrue no good. For personal instruction you may write K. S. V. Nath, Magician. Podukota.

124 Narainsingh Narinder Singh. You will find the process of refining oils in the booklet on Hair Oil Manufacture which you must have received by this time

125 S. K. Mankeswar & Co. Want to be put in touch with dealers in waste tyres and rubber. Will any reader communicate to them which firm in India does cattle insurance business.

126 G. D. Gadgil. Recipe of waterproof cloth used as motor hood will be out in an early issue of INDUSTRY.

128 S. W. Welattheri. Toys may be bought of Q. Ahmad & Co., 41, Bentinck Street; K. B. Nan, 233, Old China Bazar Street and Pioneer Toy Mart, 234, Old China Bazar Street; all of Calcutta. For starting small industry please go through September 1923 issue. Can supply tapieca.

129 M. Lakshminarayana & Sons. Swan ink may be had of Nilmoney Halder & Co., 106, Radha Bazar Street, Calcutta. Soaps of all kinds may be supplied by S. C. Dass & Co., 4, Sukeas Lane, Radha Bazar, Calcutta. For pomades etc. try Well & Webb (Eastern) Ltd., 19-1, Bow Bazar Street, Calcutta. For biri write to Moolji Sicks & Co., 51, Ezra Street, Calcutta. Sieves may be purchased of Gopal Chandra Dass & Sons, 142-1, Radha Bazar Street, and Madhoram Hardeodass, 132 Harrison Road; both of Calcutta.

130 The Stores. Leather goods may be bought of W. S. Dossen & Co., College Street Market, 21, Swadeshi

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131 Pandit Braj Behari Lal. To communicate with any querist write him with name and number under care of INDUSTRY when your letter will be duly redirected.

132 K. P. Menon. An article on paper manufacture appears elsewhere in this issue.

133 Syd Rapinatido. Your previous letter is not traceable ; please repeat your queries

134 Pandit Dev Raj. You may write to J. F. Kellner & Co., Chowringhee, Calcutta for the address of the agent of Johan Faber pencil in the Punjab.

136 Mahananda Chowdhury. Assam Commercial Co., P. O. Rehabari and Jaiyur Tea Seed Emporium, Panitola ; both of Dibrugarh, Assam deal in tea seeds. For ivory try L. H. Lilaram & Co., 9, Park Street and K. D. Hanram & Co., 10A, Lindsay Street ; both of Calcutta.

138 Keshab Lal Dutt. Refer your query to Military Department, Government of India, Delhi.

140 Amir Chandra. Sunlight soaps are largely stocked by M. Framrose & Co., 9, Bank Street, Fort, Bombay.

141 F. Ahmed. Add an ounce of rectified spirit to a pound of jams or jellies to be preserved. Please explain clearly what do you mean by Surati halue.

144 S. T. Nursian. Manganese per oxide is obtained by the ignitions of manganous carbonate in the absence of oxygen. It is a greenish compound, which readily absorbs oxygen, being converted into a higher oxide. Manganese dioxide is the most plentiful natural source of manganese and at ordinary temperatures is perfectly stable. It is largely mined in Spain and in the Caucasus mountains.

145 Moharaed Yaqub Khan. For Derby Sweep tickets enquire of J. D. Rai, Puding Block, Kalimpong, Darjeeling.

146 R. K. Chhatre. For the required punching machine write to Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta.

150 Y. G. Potdari. Dissolve some washing soda in a suitable quantity of water and after boiling for about an hour wash the cloths as usual. In case of bleaching powder boiling is not required.

153 Benode Behary Banik. An article on Tobacco for *Hookah* appeared in October 1924 issue of INDUSTRY.

156 W. Rafferty. Process of manufacturing crucible appeared in September 1924 issue.

157 Dhabjee Birbhadrajee. For cigarettes of required design enquire of Karim Bux & Elahie Bux Bros., 58-4, Canning Street, Calcutta. For photographic lens enquire of Calcutta Camera House, Chowringhee, Calcutta.

159 S. Ramamorthi. Process of preparing candle appears elsewhere in this issue.

161 L. S. Achari & Sons. For the required machines write to Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta. For small lathes enquire of Alfred Herbert Ltd., 11, British Indian Street, Calcutta. For nib making machine try Bengal Small Industries Co., 91, Durgacharan Mitter Street, Calcutta.

162 K. Srinivasulu Naidu. First of all prepare ink powder ; then adding some adhesive make pills in a pill making machine. Recipes of hair dye appeared in January 1925 issue. Recipes of textile dyeing appeared in December 1924 issue. Process of printing on cotton goods will also be found in the same issue.



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164 M. M. Mohanti Verma. Before taking the gas 10-273 C owing to the great loss of heat the substance will freeze when Charles's Law will cease to operate. For further particular, read advanced text books on treat. Guns and gun parts may be bought of K. C. Biswas & Co., 1, Chowringhee Road, Calcutta and D. N. Biswas & Co., 5, Dalhousie Square, Calcutta. Jintan being a patent article its formula is not known. Recipe of watch oil appears elsewhere in this issue. The following books will be of much use to you : (1) Dairy Farming in India by D. J. Meghar & K. E. Vaghan ; (2) Poultry Keeping in India by Isa Tweed ; (3) The Farm Manual (India) by William & Meghar and (4) Cow Keeping in India by Isa Tweed. Your other enquiries are engaging our attention.

166 S. C. Bose & Brother. Please explain clearly what you want. Want to be put in touch with sellers of Lanker Corregvi tobacco.

167 Tulsi Ram. Wants a loan of Rs. 1,000 without interest.

168 K. V. Shenai. Your enquiry is not in our line. You may however write to Secretary, Royal Calcutta Turf Club, 11, Russel Street, Calcutta.

169 Bisben Singh. For address of Messrs Mahabir Swadeshi Stores, write to Chandigram's Weaving Factory, Rohri. Other addresses are not known.

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170 Abdul Aziz For the books required enquire of Anandasram, Poona City.

171 Vayaskara Mooss. Refer your enquiries to J. F. Madan & Co. Ltd, 5, Dharamtala Street, Calcutta.

175 M. Nurudin.—For German directory try Archiv fur Welthandel A. G. Bellevuestrasse 14 Berlin, Germany. You may go through the following journals : (1) La Vie Technique et Industrielle, 18 Rue Segiver, Paris ; (2) L'Exportateur Francais Paris, (3) Uebersee Post, 10 Salomonstrasse, Leipzig, Germany and (4) British Trade Review, 113-115-117 Caveron Street, London E. C. 4.

176 Commerce and Industry Exchange—Please refer your query to Mr. A. P. Ghosh, Match Expert, 42 Beniapukur Road, Entally, Calcutta.

177 J. H. Sarcar.—We cannot venture opinion regarding the respectability of an individual institute or firm. You may correspond direct.

179 Ami Chandra Gupta.—For laughing glass try K. B. Nan, 234 Old China Bazar Street and Pioneer Toy Mart, 233 Old China Bazar Street ; both of Calcutta.

180 Har Prasad.—We do not deal in any article ; we only furnish information to those who require. Thread ball making machine may be supplied by Oriental Machinery Supply Agency Ltd, 20/1 Lall Bazar Street, Calcutta.

185 A. Loganatham.—For learning textile industry write to the Principal, Serampore Government Weaving Institute, Serampore, Howrah for a copy of prospectus.

186 R. K. Chitole.—Refer your query to Mackenzie Lyall & Co., 5 Mission Row, Calcutta.

187 M. B. Marfatia.—For metal market report write to William Jacks & Co., 1 Lall Bazar Street, Calcutta.

189 Assam Nirsing Factory.—Chemicals for glazing pottery may be bought of B. K. Paul & Co. 1-3 Bonfields Lane, Calcutta. Minerals may be bought of Calcutta Mineral Supply

Agency, 31 Jackson Lane, Calcutta. There is neither an institution nor a firm who takes apprentices for teaching glazing pottery. You may have the moulds prepared as per order by local carpenters.

190 K. P. Menon —An article on paper manufacture appears elsewhere in this issue.

196 S. R. Nagabhusan Row.— Refer your query to the Analyser to the Government of India, Test House, Alipore, Calcutta.

197 V. C. Garwad.—For old journals and periodicals try Khalil Ahmed, 18 Shyama Charan De Street, Calcutta. A good recipe of furniture varnish appeared in November 1923 issue. In order to be aware of the properties of the stone mentioned by you, have it analysed by a chemical analyser.

198 Tulsi Ram. An article on snake-bite cure appeared in August 1921 issue. Formula of soaps similar to sunlight soaps will be found in the same issue. Recipe of Jintan is not known. Wants to be put in touch with dealers in betel leaves. Your other query is in the nature of an advertisement; hence it should not be published in these columns.

199 D. B. Javeri. To dispose of the article in question please advertise in the pages of same widely circulated papers such as INDUSTRY. For cotton waste try P. S. Michael 76 Prinsep St, Calcutta. To establish business connection with weavers send them circulars clearly explaining your line of business.

200 Brajanandan Sahay. You may consult Thacker's Indian Directory to had of Thacker Spink & Co, 3 Esplanade East, Calcutta.

203 M. M. Saldin. Aniline dyes may be brought of Aminchand Mehra & Sons, 34 Armenian Street and Hansraj Visram, 13 David Joseph Lane; both of Calcutta.

205 U. Chit Htoo & Sons., Rubber balloons are filled with hydrogen gas. Hydrogen gas is not available in the market. You will have to prepare it

yourself. For preparation process go through any manual on chemistry.

206 Thukha Bala Medical Hall. Coconut oil cannot be kept liquid during winter. But if you mix with it an equal quantity of til or some other oil, the mixed oil may not freeze during winter.

208 Mohamed Ali. You may consult Match Industry by Mr. K. C. Sen, to be had of Bhowani Engineering & Trading Co., 122-1, Upper Circular Road, Calcutta. Match machines may be bought of Bengal Small Industries Co., 91, Durga Charan Mitter Street, Calcutta and Bhowani Engineering and Trading Co., address given above.

209 Haviram Sadaanand Khanna. As you are already in business line, we hope, it will be advisable for you to study commercial subjects.

210 S. K. Shunnugu Nader. To export chillies you may correspond with the following firms; (1) D. Nagase & Co., Ltd, 5, Fencourt, London E. C. 3.; (2) Travers Joseph & Sons Ltd, 119, Cannon Street, London, E. C. 4.; (3) L. Foeyte, Martinistrasse 24, Bremen, Germany; (4) Zabel Conrad, Martinistrasse 16, Bremen, Germany; (5) Kerkpatrick Brothers, Scranton, Pennsylvania, U. S. A. and (6) Wixon Spice Co, 150W, Illinois, Chicago, U. S. A.

211 Ram Charan De. Precious stones may be supplied by Austin & Williams, 6, Conduit Street, London

Soap & Perfume Manufacturers.

FREE

Samples

of perfumes for above trade will be sent on receipt of the inquiries from bonafide manufacturers. Excellent qualities of the highest strength.

PRICES LOWEST.

Write for Samples to-day—

Anglo-Indian Drugs & Chemical Co.,

155, Juma Masjid Circle, P. O. Box 2082, Bombay.

W 1 ; Robinson Max & Co., 39, Hatton Garden, London E. C. 7 ; California Jewellery Co., San Francisco, California, and Stern Bros. & Co., Chicago, Illinois ; last two of U. S. A.

212 Rajindra Brothers. For the addresses of vernacular newspapers consult Thacker's Indian Directory to be had of Thacker Spink & Co., 3, Esplanade East Calcutta. You may however correspond with the following parties for the present : Editor of Dainik Basumati, 166, Bow Bazar Street, Calcutta ; Praja Mitra and the Parsi, The Times Bldgs., Fort, Bombay ; Akbar-i-Am, Lahore and Suddharam Prachark, Saharanpur.

214 Chuni Lal Jaini. Your enquiry is receiving our attention.

215 Tuisi Ram. All the books mentioned by you may be bought of Kamala Book Depot Ltd., 15, College Square and Thacker Spink & Co., 3, Esplanade, East ; both of Calcutta.

216 M. P. Sankara. Refer your first two queries to Agri-Horti Society of India, 1, Alipore Road, Alipore, Calcutta. You may go through The Journal of Ayurveda published at 2 Horokumar Tagore Square, Calcutta.

217 Mansoor M. Joseph. If you can suggest a line in which you are interested we can help you with the necessary information on that subject ; otherwise it is very difficult to suggest a line of business which will suit you best. Again individual taste works much in business success. So please name some of business lines which you wish to adopt. Civet is a valuable perfume obtained from the civet cat, a native of Brazil, Guinea, Madagascar and the East Indies. This perfume is produced by both sexes, and is contained in two cavities or pockets placed beneath the tail. Civet is of a clear yellowish or brownish colour, about the consistence of honey, and uniform throughout. Undiluted, the smell is offensively strong ; but when mixed with substances, it becomes what some consider a fragrant perfume. It was formerly in high repute, but is at pre-

sent little used, excepting in the composition of some kinds of perfumery to increase the power of other scents. Wants to be put with dealers in civet.

218 Upasena Ediriweera. An article on Ink Manufacture appeared in November 1922 issue. Formulas of soap similar to sunlight soap appeared in August 1921 issue. Process of preparing various kinds of biscuits appeared in February 1925 issue. Recipes of slate pencils appeared in March 1923 issue. For gums write to S. N. De, Post Box 7851, Calcutta. Indigo may be bought of S. Chatterjee & Co., E 4, Clive Bldgs and M. M. Ispahani & Sons, 51, Ezra Street ; both of Calcutta.

219 Jethabhai Hemraj. Formulas given in April, 1922 issue may be applied when a large quantity of oil is to be deodorised.

220 P. B. Fall. Plumbago is a kind of graphite.

222 F. C. Handa & Co. For tin boxes write to Ram Pratap Gajanand, 6, Halsi Bagan Road, Calcutta. An article on Rosin and Turpentine appeared in September 1920 issue of INDUSTRY.

223 J. C. Dass. Oils for manufacturing soap may be bought of Ramlingam Pillai, Vilanvancode, Travancore and P. M. Shaw & Co., Umed Bhagwan Bldg., 115, Bhowada 3rd Lane, Bombay. For scents enquire of D. G. Gore, Sayana Bldg., Lohar Chawl, Bombay. For chemicals try The Eastern Chemical Co. Ltd., 15, Dougall Road, Ballard Estate, Bombay. Dyes may be supplied by Cama Norton & Co., Kanji Street and Chudgor & Co., 32, Appollo Street ; both of Bombay. If you use shell lime in soap making the product will not be satisfactory. Vernacular equivalents of chemicals you have mentioned are not available.

226 The Asian Trading Co. Recipe of snow cream appeared in July 1924 issue. Process of bottle capping with gelatine appeared in October, 1924 issue.

227 N. Govindjee. Wants to be introduced to suppliers of coffee bags.

228 B. Padmanabha Rao. Wants to be put in touch with manufacturers of Kallimathi silk.

229 V. M. Singh. Silk goods may be supplied by Sasanka Shekhar Bagchi, Khagra, Murshidabad; Bhagalpur Silk Stores, Sujaganj, Bhagalour, Har Chand Roy Anand Ram, 207 1, Harrison Road, Calcutta; Manniram Harjiwanram, Gaighat, Benares City and Home Industries Association, P. O. Kamakhya, Gauhati, Assam. For pearls enquire of Rai Budree Das Bahadur & Sons, 252, Harrison Road and Tara Chand Parsram, 57, Park Street; both of Calcutta.

230 Surendra Chandra Bhattacharjee—For particular regarding multiple husker write to C. S. Sagar, 86-1, Narkeldanga North Road, Calcutta.

231 S. G. Leniava. You may write to the following cigarette manufacturing concerns whether they take any apprentice or not; Swami & Co., 18, 2nd Line Beach, Madras; Universal Tobacco Co. Ltd., 1-6, General Patter's Road, Mount Road, Madras; Khedivial Tobacco Co., 1, Khar Road, Bandra Bombay and Chari & Co. Ltd., 5, Mission Row, Calcutta.

232 S. K. Andare. For novelties enquire of Laurel Novelty Co., 43, Park Street, Calcutta; Mahomedbhoy Jivabhoj & Co., Nizam Street, Bombay; Indo-German Trading Co., Cocanada and R. Mediratta & Co., Lahore. For second-hand journals write to Khalil Ahmed, 18, Shama Charan De Street, Calcutta. For Kashmere Guide enquire of A. H. Wheeler & Co., 117-119, Park Street, Calcutta.

233 S. M. Sircar, Dextrine, etc. may be bought of Crystat Works, 67, Durga Charan Mitter Sereet, Calcutta. For starting small profitable industry go through September, 1923 issue of INDUSTRY. Wants to know the address of the agent of Robinson's Patent Barlesy.

235 D. D. Landya. An article on the construction of dry batteries appeared in March, 1924 issue.

236 W. N. S. Aserappa. Books on commercial subjects may be bought of Kamala Book Depot Ltd., 15, College Square and Thacker Spink & Co., 3, Esplanade, East; both of Calcutta.

237 M. Tapadar. To sell the recipes in question advertise in the pages of INDUSTRY.

238 Harnam Chander. For envelope making machine parts try Calcutta Industries Ltd., 71, Canning Street, Calcutta and Bengal Small Industries Co., 91 Durga Charan Mitter Street, Calcutta.

239 Ram Raghbir Lal & Sons. Plumber's materials may be supplied by Ince & Silk Ltd., Esplanade Mansion, 1, Esplanade Row; Chowdhury Brothers, 34-1, College Street and Chakraverty Roy & Co., 30, Clive Street; all of Calcutta.

240 Sayed Ahmad Ullah. For tricycles enquire of Dutt Dass and Co., Mercantile Bldgs., Lall Bazar; Standard Cycle & Motor Co., 43-1D, Dharamtala Street, Mallik Brothers, 10, Bentinck Street and S. N. Bhattacharji, 5, Dharamtala Street; all of Calcutta.

244 The Students' Co-operative Stores. German goods are imported by Laurel Novelty Co., 43, Park Street; Singh Sircar & Co., 125, Harrison Road; both of Calcutta; Mohamedbhoy Jivabhoj & Co., Nizam Street, Bombay No. 9 and Indo-German Trading Co., Cocanada.

245 M. Ranga Rao. A series of articles on cement manufacture appeared in the 10th volume of INDUSTRY. Lime may be bought of Maihar Stone & Lime Co. Ltd., 3 & 4, Hare Street and Gladstone Wylie & Co., 5, Council House Street; both of Calcutta.

249 Maung Ba Su. If you go through the advertising pages of INDUSTRY you will find the address of many German novelty dealers. Please refer to No. 244 above.

251 S. Burden. Manganese dioxide etc. may be had of Calcutta Mineral Supply Co., 31, Jackson Lane; Oriental Industrial Co., 9, Bonfields Lane, Calcutta Chemical Co., Panditia Road, Ballygunge; all of Calcutta.

254 Raizada H. Singh. For Ayurvedic treatment communicate with Kabiraj Shyamadas Bachaspati and Kabiraj Gana Nath Sen; both of Grey Street, Calcutta. You may also write to the Astanga Ayurvedic Vidyalaya, 17-19, Shambazar Bridge Road, Calcutta.

255 Bhag Singh. The German journals having both the German and English editions are *Übersee Post*, 10, Solomonstrasse, Leipzig and *Export Anzeiger*, represented in India by the Students' Co-operative Stores, 3833, Malthan, Agra, U. P. For advertisement rates, etc. write to them. For rules and regulation regarding the floating of new companies you may consult any text book on Indian Companies Act to be purchased of any law book dealers. For commercial correspondence you may go through two books on the subject published by the Industry Book Dept. All sorts of commercial information are not crowded in a book. There are separate books on each of the subjects. You may regularly go through *COMMERCIAL INDIA*, a sister journal to *INDUSTRY*, for up-to-date news in the commercial world. Submit your particulars to the authorities of the Directory for publication. No fees are charged unless you want to have any announcement or like to have your name printed in bold types.

257 Labh Chand. The chief agents of the cigarettes you mention are Arcadian Tobacco Co. Ltd, 80 Colootolah Street, Calcutta, and Karim Bux & Elahi Bux Bros, 58-4 Canning Street, Calcutta.

259 K. S. R. R., Nellore. An article on photography is under preparation and will be published shortly. For photo goods, you may correspond with the following firms; Calcutta Camera House, Chowringhee, Calcutta; Bombay.

Berlin Trading Co, Dady House, Church Gate Street, Bombay.

260 Nalini Mohan Chatterjee. Soldering of aluminium utensils is not possible. For morabbas, etc you may go through a book on Indian Pickles, Chutneys and Morabbas. To learn soap making you may consult the book on the subject by A. Watt.

261 K. Ramaratnam. There is no simple machinery known for spinning cotton by hand power. For particulars you may enquire of the Principal, Government Weaving Institute, Serampore or of the Director of Industries 40-A, Free School Street, Calcutta. If you mean charka, several improvements have been made and for the addresses of dealers of improved charkas enquire of Khadi Protisthan, 15, College Square, Calcutta.

262 P. B. Rodrique. Java sugar is exported by Handels Maatschappin, J. G. H. Slot & Co., Batavia, Samarang and Sourabaya; Mitsui Bushen Kaisha, Heeren Straat, Sourabaya; Wellenstein Krause & Co., Batavia; all of Java; leather is exported by Richard Evans & Sons, Johnstown, New York; Quaker City Morocco Co., Philadelphia, Pa; New Castle Leather Co., Wilmington, Del; all of U. S. A.; timber is exported by Fegens Lad & Tunnfabrik, Fegen; Fiskeley Fabriks Aktiebolag, Norrköping; Mackmyra Sulfit Aktiebolag, Mackmyra; all of Sweden; also enquire of Lumber Commissioner, Forest Branch, Victoria, British Columbia. Lumber is exported by W. R. Chamberlin & Co., San Francisco, California and L. N. Dantzer Lumber Co, Moss Point, Missouri; Kelsey and Freeman Lumber Co., Toledo, Ohio; all of U. S. A. Desire to be put in touch with the timber merchants of Calcutta, Lahore, Karachi, Mysore and Bombay Presidency.

263 T. R. Chanderson. Various suggestions for small capitalists appear regularly in the columns of *INDUSTRY*, which you may consult.

264 Sri Ram. To get yourself admitted as an apprentice in a textile

mill, apply to the managers of the various mills whose names and addresses will be found in any directory.

266 P. Narayana Nayar. To dispose of the shares you mention write to Calcutta Stocks and Share Syndicate, 2, Lal Bazar Street, Calcutta.

267 A. A. Kureshi. Reply to your previous enquiries has already been published in this issue. Dhunniing machine may be had of Khadi Prastishan, 15, College Square, Calcutta. German automatic charka is not available locally.

270 Sidhgopal Awasthi. For grinding machines try Messrs B. D. Berry & Co., 43, Ripon Street, Calcutta.

271 National Benian Industries. For processes of manufacturing mantles for gas light, consult February, 1922 issue of INDUSTRY. Mantle manufacturing machines may be bought of Oriental Machinery Supply Agency Ltd, 20-1, Lal Bazar Street, Calcutta. Mantles are manufactured in India by Fani Bhusan Kundu, to be had at 85, Harrison Road, Calcutta. Also enquire of London Eastern & American Trading Co., Hummum Street, Fort, Bombay. Vegetable fibres are such as jute, cotton, hemp, etc.

272 Bhannak's Modern Magical Co. Coffee powder may be used in the manufacture of caffeine. Can supply large quantity of coffee powder. There is no book known on tin-printing.

274 Sri Krishna and Doulat Ram. A list of Indian journal will be found in the Thacker's Indian Directory. English equivalents of Hindi herbs are not all known. Consult Dictionary of Economic Products by Watt. For recipes, etc you may go through Techno Chemical Receipt Book by Brantt and Wahl. There is no such bank as you mention. Cardboard boxes are manufactured by H. L. Satt & Sons, 8, Nilmony Mitter Street, Calcutta; Kundu & Das, 20, Gour Laha Street, Calcutta.

276 Tarachand Karmtaprasad. Ghee is sold in the Calcutta markets at

rates varying from Rs. 2 to Rs. 2.8 per seer. Wheat is sold at the rate of Rs. 6.8 to Rs. 7 per md. Can supply ghee and white wheat.

277 Bireswar Sen Gupta. The formulas given are all reliable ones and we do not know why the method will fail if the manipulations have been as instructed in the book. Another recipe however appears in this issue.

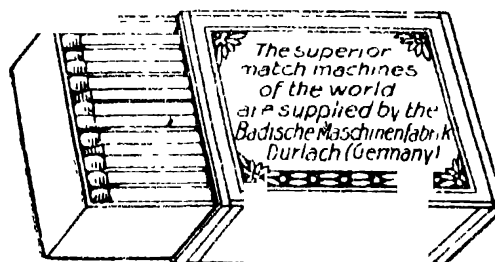
278 Vishwamitri Kishin Chand Co. Please restate on what subjects you want to be enlightened.

282 P. S. Tyengar. Bundling machines, etc may be had of Leipziger Eisenbarakraft, Leipzig, Entritzsch Germany.

283 Puran Pratap. For estimates of a rotary oil mill you are referred to Messrs Burn & Co., 7, Hastings Street, Calcutta and Messrs Jessop & Co., Clive Street, Calcutta.

286 S. R. Anjaiah Naidu. Grinding machines may be bought of Messrs B. D. Berry & Co., 43, Ripon Street, Calcutta. For the making of vinegars you are referred to the February, 1923 issue of INDUSTRY. Tit bits is published by George Newnes Ltd, 8 11, Southampton Street, Strand, London W. C. 2. Yeast or hop is a substance used in bakery helping fermentation.

289 C. B. Godbi. For particulars of printing presses make your enquiries at Mr. K. Banerjee, 133, Canning St., and Ashutosh Auddy & Co., 16, Lower Chitpur Road, Calcutta.



Suitable for big and small capitalists, guaranteed German damp proof formulas. Particulars on request with one anna stamp to :—
N. B. MUKERJEE B.Sc., consulting match expert,
Jenapur P.O. (Cuttack).
We sell Sticks and Box Veneers at very cheap rate

291 Atul Kumer Nag. For camera accessories, etc. enquire of Calcutta Camera House, Chowringhee, Calcutta.

292 Thakurdas Mohanlal & Co. Wire nail making machineries are manufactured by National Machinery Co., Tiffin, Ohio; Sleeper & Hartley, Inc., Worcester, Massachusetts; both of U. S. A. For German machineries enquire of Tiedemann Quenzel & Co., Hamburg, Hohe Bleichen 8-10.

295 Hedayet Husain. Recipes of soap appeared in the May 1924 issue of INDUSTRY. A recipe of toilet soap appears in this issue.

296 Keshavlal Nagjibhai Sangline. Wireless telephone is now under experiment and no machinery workable and perfect, is available in the market.

300 G. L. Bhagat. Please state the process you follow when defects will be pointed out to you.

302 Sunder Lal. The colour mentioned by you may be bought of Amin Chand Mehra & Sons, 34 Armenian Street and Hansraj Vishram, 13 David-goseph Lane; both of Calcutta.

303 B. B. Hardikar & Bros. Process of deodorising coconut oil appears elsewhere in these columns. To dispose of articles manufactured by you either engage canvassers or advertise in pages of newspapers and periodicals.

304 Kolluru Satyanaravana. Process of refining oils will be found elsewhere in these columns.

COME TO ME

AND LEARN THE ART OF SOAP MAKING.

For years I have manufactured soaps of all descriptions, soaps which have found a ready market throughout the country. And these secret, practical recipes are now embodied for you in a handy volume named "SECRET OF SOAP MAKING". It will teach you how to prepare at home coloured and scented Toilet soaps, Glycerine soaps, Soaps, like Sun-light Soaps, Washing, Laundry and other useful soaps with the least trouble and expense. The price of the book is Rs. 2 only, V P Charges extra. Will you write for your copy to-day to—

THE HINDUSTAN SOAPS WORKS,

(Publishing Dept No. 1)

P. O. Nawasabar, Jullundur.

305 Nait Ram. For good hair dye enquire of Hakim Masihur Rahman, 90A Lower Chitpoot Road, Calcutta.

306 K. V. Ranga Row. Tea is most grown in Assam, Darjeeling, Ceylon and in some parts of South India. Coffee is mostly grown in South India and cocoa in Ceylon, Malabar and the Nilgiri Hills. For tea enquire of Sangu Valley Tea Co., 9-1 Chowringhee, Calcutta; Bhattacharjee & Co. Ltd, 1 Swallow Lane, Calcutta; Parry & Co, 1st Line Beach, Madras and Hellmen's Tea & Trading Co. Ltd., Kalimpong, Darjeeling. Silk goods may be supplied by Harchand Roy Anand Ram, 207-1 Harrison Road, Calcutta; S. C. Saha, Khagra, Murshidabad and Nagar Brothers 21 Golagate, Benares City. Coffee may be bought of Berimy & Co. Ltd, 7 Armenian Street, Madras; Wilson & Co, George Town, Madras; and R. K. Motishaw & Co, 11 Hummum Street, Fort Bombay.

308 Bhagavan Chetty & Co. Answer to your queries appeared in March issue under No. 3335

309 Jagannath Mulewar. Process of making matches damp-proof appeared in August 1924 issue.

311 H. & C. Brothers. Want to be introduced to dealers in antimony.

312 A Raghaviah. Recipes of dyeing yarn will be found in December 1924 issue. For starting prospective industries please go through September, 1923 issue of INDUSTRY.

313 P. Narayana Murty. Steel trunks may be purchased of Arya Factory, 15, Paymental Garden Lane, Tangra; B. Brothers & Co., 36 Harrison Road and Bysack Factory, 3, Brojo Dulal Street; all of Calcutta. Your other query is not in our line.

315 M. K. Ghosh. For leisure time work please go through New Idea Columns of INDUSTRY.

316 Jyoti Prasad Agarwala. An article on photography will appear in an early issue.

318 Mahomed G. Mansuri. Your letter is being enquired into for proper reply.

319 L. P. Saksena. Stationery articles are imported by Eastern Import and Export Co., 146-148, Bazar Gate Street; A. A. Dhand & Co., Mandvi and Ramlal Kapoor & Sons, 626, Princess Street, Mangaldas Road; all of Bombay. For rubber stamp accessories try B. N. Bysack, 1-1, Ramchand Ghose's Lane, P. O. Beadon Street, Calcutta. Desires to be put touch with dealers in Wazirabad stick.

320 D. N. Das. For various kinds of earth enquire of Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta and Williamson & Co., Oldham Road, Gaya.

322 Friends Five & Co. For glass phials of required design write to Satya Charan Paul & Sons, 194, Old China Bazar Street, Calcutta and C. K. Das & Sons, 17, College Street, Calcutta. For lathes of required description try Alfred Herbert Ltd., 13, British Indian Street, Calcutta. An article on dry cell construction appeared in March, 1924 issue. Your other enquiry is receiving our attention.

325 P. R. Naik. For industrial books write to Chakraverty Chatterjee & Co. Ltd, 15, College Square, Calcutta.

326 Ananta Ram Sharma. Tanning materials are mainly exported to United Kingdom, United States in America, Belgium, France, Germany and Italy. These are mainly exported from Calcutta, Bombay and Madras. These are exported by David Sassoon & Co. Ltd., 4, Lyon's Range, Calcutta.

329 H. C. Kujur. Sewing machine may be bought of Indo German Trading Co., Post Box 243, Madras. For tacks enquire of E. B. Bros. & Co., 11, Dharamtala Street, Calcutta.

334 M. A. Abamad. For sewing machine see above. For laces enquire of A. R. Wimalasiri, Dangedara Galle, Ceylon; S. R. S. Peterson & Bros., Ellore, Kistna; G. John Thatbayya &

Sons, Amalapuram, Godavari & H. Abamad Hasan Allawala, 69, Khengraputty, Bara Bazar, Calcutta. Wants to be put in touch with lungi merchants of Pulicata, Putbupet and Conjeeveram.

335 Diwan Singh & Sons. An article on nut button manufacture appeared in November, 1924 issue.

336 V. S. Saksena. Desires to buy soot obtained from linseed, gingelly and castor oils; acacia catechu and lac.

337 Carr Bros. Castor oil may be bought of Rose & Co., P. O. Box No. 30, Cocanada and Vuppatury Narisimham Son Co., Guntur.

338 Chuttan Lall. Suggestion regarding stamp collection will be found in December, 1922 issue.

339 Gopal Pd. Gupta. Consult a physician.

341 A. S. Gurukambal. An article on ice manufacture appears elsewhere in this issue. Please explain clearly your other query.

342 Bhagat Ram Sukala. If you are willing to start some industry you may go through September, 1923 issue of INDUSTRY where you will find some suggestions for starting prospective industries. To secure agencies you should write to the parties whose goods you wish to represent. If you go over the Sale and Exchange pages of INDUSTRY you will get there lots of firms anxious to open agencies for their goods.

345 Pt. Shama Rao. For ferro-prussiate printing materials write to Bengal Miscellany Ltd., 99, Manicktala Main Road, Calcutta. Process of preparing ferro-prussiate paper appeared in the last issue.

Ask for Free Price List of all Requisites of

Soda Water Factory

Machinery, Spare Parts, Gas Cylinders, Acids Colours, Essences, Saccharine, Sundries, Labels etc. etc. will be supplied at a moderate rate. For Price List and other particulars write to—
BOMBAY UNIVERSAL AGENCY.,
Ambewadi, Girgaon, Bombay.

346 A. P. Chatterjee. Process of bleaching cotton goods appeared in Jan. 1924 issue. For industrial books enquire of Chakraverty Chatterjee & Co. Ltd, 15 College Square and Thacker Spink & Co, 3, Esplanade East; both of Calcutta.

348 K. D. Mukherjee. Your enquiry is receiving our attention.

350 O. S. Maung Maung. You may use methylated spirit in place of alcohol. Dyes you have mentioned may be bought of Aminchand Mehra & Son, 34, Armenian Street; Mohamed Aliboy & Co., 44, Armenian Street and Hansraj Vishram, 13, David Joseph Lane; all of Calcutta.

351 S. Hyder Imam. To sell China clay and corundum write to Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta.

352 S. Narayana Swami. Uses of lemon grass oil appear in November, 1924 issue. Can supply lemon grass oil in very large quantities.

355 H. R. Venkappiah & Bros. Curios may be bought of Curio House, 17-2, Chowringhee, Calcutta and The Oriental Stores Stall No. 119, 120, 121, Hog Market, Calcutta.

356 N. V. R. Kameswar Row & Co. White oil and til oil may be bought of Panch Kari Tat & Sons, 6, Meerbahar-ghat Street and Anath Nath Dey, 3, Moidaputty, Bara Bazar; both of Calcutta. Olive oil may be purchased of B. K. Paul & Co., 1-3, Bonfields

Lane, Calcutta. Are desirous of buying bidi manufactured in Calicut. Want to be put in touch with manufacturers of enamelled buttons of Multan.

358 R. H. Whitepaint. So old paint can be utilized in no other way except as fuel.

359 H. M. A. Khabiq. You may use aniline colour. Recipes of essences will be found in September, 1924 issue. Panelled bottle may be bought of Satya Charan Paul, 194, Old China Bazar Street and C. K. Dass & Sons, 17, College Street; both of Calcutta.

360 Devadhari Sinha. Bank rate often fluctuates. It is now 7 per cent per annum.

361 J. M. Chedi. For patent registration write to P. Lodge & Co., Post Box 6772, Calcutta.

362 I. V. V. Dikshitulu. An article on cigar and cigarette manufacture appeared in September 1920 issue of INDUSTRY. For industrial books enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta.

363 C. A. A. Abdul. Refer your first query to Industry Department, Mysore. Read some books on mining. Recipes of safety match composition appeared in September 1923 issue. For particular of the paper mill mentioned by you write to the Registrar Jointstock Companies, Government Place, Calcutta.

364 S. M. D. Moinuddin. Yes, you may send the particular of your mill.

365 Qazi Nazeer Hasan. Can supply wild animals. To communicate with any querist write him with name and number under care of INDUSTRY when your letters will be duly redirected.

367 V. Thungavahn Norer. We do not give practical training for starting various kinds of manufacturing industries but we publish practical suggestions and recipes in each issue of INDUSTRY. Formulas of almost all the articles you wish to manufacture appeared in the last volume. For syrup you may consult Syrup Manufacture published from this office.

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New Prizes for Vol. XVI.

The Editor of *INDUSTRY* invites its subscribers to compete for the following prizes offered for the ensuing Session.

I. New Ideas for Small Capitalists.

We offer 5 Prizes of Rs. 5 each for ideas which can be successfully adopted by a young man with capital up to Rs. 500 only in his pocket to earn a decent livelihood. Schemes for starting small industries will be welcome but stress will be laid on their practical adaptability which will influence decision.

II. Suggestions for Self-Supporting Students.

We offer 5 Prizes of Rs. 5 each for suggestions which can be easily carried out by students who follow the principle of earning while learning and must enable them to defray their expenses at least. The practical nature of the suggestions will be taken into consideration in awarding the Prizes.

III. Occupation for Purdahnaas Ladies.

We offer 5 Prizes of Rs. 5 each for details of useful domestic industries which can be worked by the female members of a family in their spare hours. Special opportunities may be pointed out how a helpless widow can earn a decent living for herself.

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IV. Village Manufactures.

We offer 5 Prizes of Rs. 20 each for informative articles on our cottage industries. These articles should give complete synopsis of all the existing arts and crafts of India, their present condition of development, raw materials used, methods and procedure, market for products, names and addresses of persons engaged, their economic condition, lines of improvement, etc. accompanied by sketches and photos of the improvement and of tools employed, if possible.

Rules for Competition.

1. Only subscribers to *INDUSTRY* are eligible for the Prizes.

2. The Editor's decision will be final and he will be at liberty to publish any communication in any way he likes. The names of successful candidates will be published in the first issue of the next volume.

3. The Editor will not be responsible for loss of or damage to any correspondence, neither will he remain bound to return any Manuscript.

4. The Editor cannot enter into any controversy regarding unused or rejected Manuscript. But in case requisite stamps are enclosed every endeavour will be made to send them back.

5. The Ideas, Suggestions and Articles for the separate sections noted above must be written on one side only on separate sheets of paper and addressed to —

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NOTICES AND REVIEWS.

Ink Powder.

The agent for ink powder of B. U. Bhuvan is Mr. R. C. Khadilkar, Sangli, (S. M. C.)

Acknowledgments.

We have received from Mr. P. Ch. M. Sastry, Razole, S. I. a talisman, Sri Rama Raksha.

Cutlery.

The knives made by The Krishna Cutlery Works of Wazirabad (India) have made a reputation in the market for their superior qualities.

Soaps.

Both toilet and washing soaps of good quality are manufactured by The Oriental Soap Works, Tanjore. Surya-kanti is a brown variety while Jagat-kanti is a white variety.

Ink.

We are satisfied with the samples of writing fluid and ink powder for steel and fountain pens prepared by Ampson's Small Industries and to be had of A. M. Pillay, Nannilam, S. I. Ry.

Picture Cards.

Beautiful picture cards of religion, scenery, greeting etc. may be supplied by Messrs E. P. Abraham & Bros., Lower Bazar Road, Edavazi-kal, Kottayam Post, S. I.,

Crayons.

Messrs N. M. Acharya & Sons of Washermanpet Post, Madras, India have sent us a packet of coloured crayons of different shades. Being swadeshi from start to finish we would recommend them for use in Indian schools.

Magic Pad.

One can write on Azuz's Magic Writing Pad without pen and pencil. It may be had of Messrs. T. L. Chettiar & Son, Tiruvadi, Tanjore, Dt.

A Booklet.

Naveena Indrajalam edited by Prof. K. S. V. Nath, F. I. A. M.Sc., Pudukotah. Pp. 100. Price Rs. 5 only.

This is a book on Magic in Tamil : but unfortunately as we are not acquainted with the language it has remained a sealed book to us.

Detergents.

We have received samples of pure soap nut powder and Malux Soap Dust for washing clothes from the selling agents. The Imperial Coy. of Commerce Post Box No. 72, Bombay.

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POSTAL COACH,
Rajuri, (Poona).

Acknowledgment.

We have received from General Supplies Company, P. O. Box 167, Karachi, India a chart of the palm from which a sound knowledge of palmistry may be obtained.

Calendar.

We acknowledge with thanks the receipt of 1 date calendar and 1 sheet calendar from Ayurvedic Medical Hall, Coringa, Godavari.

Received from the Public Printing Press, Kucha Lala Rura Mull, Ludhiana, a sheet calendar for 1925.

A Scientific Society.

The Review of activities of The Society for Promoting Scientific Knowledge, Lahore during 25 years (1900-1925) reveals that much useful work has been achieved by it in the domain of science. The twenty-fifth annual report also shows a very satisfactory state of affairs. We heartily congratulate the organisers in their noble endeavour and wish that more such associations were established in different parts of India.

A Business Primer.

"Salesmanship." Published by The Modern Publishing Co., 128-38-A, Cornwallis Street, Calcutta. Pp. 82. Price As. 12 only.

The art and science of salesmanship has been expounded in this valuable primer in a lucid style. With the growth

of commerce and trade in this country the need for trained salesmen will grow from more to more. Aspirants to this avocation of life would therefore do well to possess a copy.

An Industrial Bulletin.

The Manufacture of Glue by Mr. N. N. Inuganti.

The bulletin embodies the results of the research work carried on by the author in the industrial laboratory attached to the Department of Industries and Commerce, H. E. H. the Nizam's Government, Hyderabad, Deccan. It contains very practical information about the manufacture of glue, an industrial product with numerous application, together with scheme and estimate.

Patent Medicines.

Maruthi Sanjeevi Dravam is a medicine for all kinds of aches, pains, stings etc to be had of The General Supplies and Trading Co., 251, Goods shed Street, Madura.

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P. O. Nandol, Nr. Ahmedabad

Trade Enquiries.

[To communicate with any party address by name and number under care of INDUSTRY when the letter will be duly redirected]

3716 N. Mallikharjan. Desires to be introduced to timber merchants of Bombay and Calcutta.

135 E. V. Unnicheria. Can supply Talipoh palm seeds in very large quantities.

57 V. Sreenivasan. Wants to be put in touch with manufacturers of picture frame moulding.

137 Textile Machinery & Stores Co. Desire to be put in touch with dealers in cotton waste.

147 A. S. Natham. A young man wants to be an apprentice in a factory.

155 B. C. Biswas. Wishes to buy gypsum, barytes, soapstone and also bristles in very large quantities.

207 C. S. Cannon. Can supply stick lac in very large quantities.

R. Muttiab, Hugh Low Street, Ipoh, Parak, F. M. S. Desires to take agency of Indian manufactured goods.

264 Sri Ram. A student of the Govt. Textile Institute at Amritsar wants to be an apprentice in a cotton mill.

268 Bande Mataram Match Factory. Can supply splints and veneers for match manufacture.

269 Dodwell J. Abeysekera. Can supply cinnamon leaf oil and cinnamon chips in very large quantities.

297 M. Rees, 34, Welford Road, Leicester, England. Desires to appoint an agent in India for boot makers' and repairers' machinery and hand sole stitching machines,

301 E. P. Abraham & Bros. Are prepared to accept hand bills for distribution free of charge.

327 J. N. Sen. Requires regular supply of large quantities of mohua and groundnut oils preferably from Bihar.

332 N. S. Kanakarathne. Wants a loan of Rs. 5000 to start an export business.

347 S. Mahadho & Son. Want to be put in touch with dealers in gallnuts.

399 N. Chandra Sekharachary. Can supply balancas used by jewellers.

May Issue of Industry.

(In the Press)

The May issue of INDUSTRY will contain articles on Tablet Making, Glass Blowing, etc. in addition to the usual features such as New Ideas, Small Trades, Formulas. Any friend of our subscribers may get a copy free as sample on application to the Manager INDUSTRY, Calcutta.

INDUSTRY

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Industry is published at the end of every month. Subscribers are enlisted at any time of the year but they will receive only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V.P.P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V.P.P. For particulars and Advt. rate please write to—

Manager, INDUSTRY OFFICE,
Shambazar, Calcutta.

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— they shall Inherit the earth

In whatever walk of life a person may be, it is his health that determines the success and happiness of his life. To be healthy is to pave the way for happiness, and as happiness in this world is the highest state one can attain, everyone should endeavour to be always healthy. More health is lost in this world than gained, because of the unhealthy ideas rampant amongst people. The normal condition of every person must be Healthy. In view of conditions which make for ill health and disease, timely resort to medicines of proved merit becomes a necessity.

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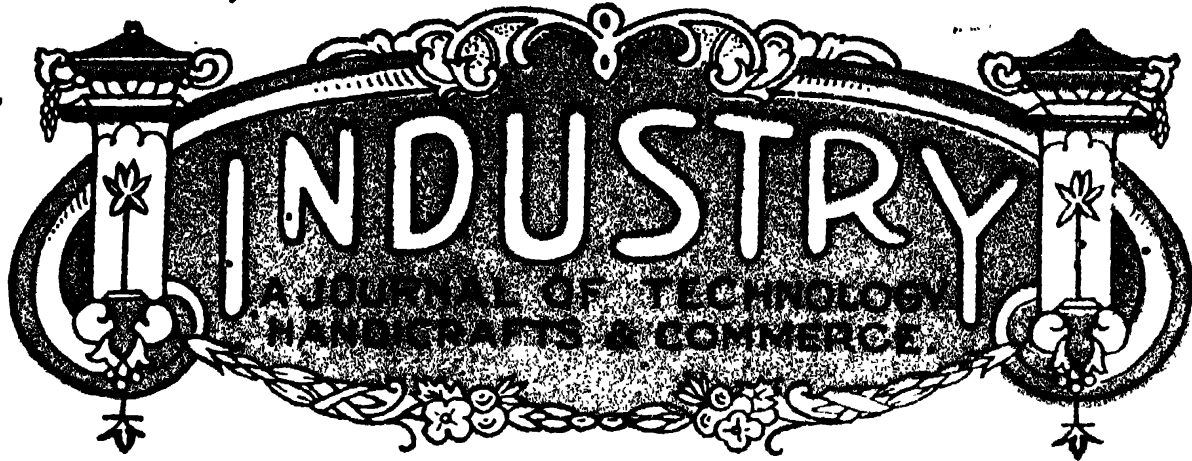
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THIS is a three-legged round table as per illustration above. This table has been specially designed and made to ensure quickest and best possible results in Spiritualistic performances. The round plank of the table has in its centre Professor Kotie's renowned magnetic compound saturated with highest powers. Moreover, the table has been bestowed with the harmony of copper and zinc together with a very powerful magnetic compound so as to give best results in the Spiritualistic performances.

Through this table you can call spirits of the dead persons from the spirit-world and have communication with them. You can ask any question from the spirit that is brought in the table so easily, and the spirit in the table replies those questions in a most mysterious manner. You can also ask the spirit to leave the table and come upon some person (any person either a man or a woman or even a child) and that person will in an instant become unconscious of himself and he will be fully under the influence of that spirit. You can then talk with the spirit and the spirit will reply your questions through that person just in the same way as two persons talk with each other. You can ask any question and any thing regarding the past, the present and the future and the spirit will give you correct informations with regards to them. If supposing a certain gentleman has died, and at the time of his death he could not give to his sons correct information as to where he had kept buried his wealth or supposing the dead had to give some advice and some other important informations, and he could not do that on account of his sudden death; in such cases you can bring the spirit of that dead person in this Spiritualistic Table of ours and get the required informations through him. This wonderful table has been prepared Scientifically and it is guaranteed to give entire satisfaction in its working these wonders. We bind ourselves to refund full price in case of any failure. Price Rs. 18 only. When ordering please mention the name of your nearest Railway Station. Half the price must accompany the order.

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Industry

A JOURNAL OF TECHNOLOGY, HANDICRAFTS & COMMERCE

VOL XVI.

CALCUTTA, MAY, 1925.

NO. 182

THE FORWARD STEP.

THINK out new ways, new methods — take the forward step in every undertaking because the way in front is always open.

The forward step is always the link that connects the beginning of an undertaking to the final achievements and this forward step depends upon scientific management of the things—upon applying the scientific methods to manufactures, to industry, to trade.

And how this habit of application of scientific methods may be developed among our people is a subject that demands keen and intelligent study. Our blacksmith commenced his trade since the beginning of civilisation in India and ceased development some four thousand years back. He is still plying the time-worn bellows even now when the progressive people of the world advanced by leagues.

Our carpenter is working the same chisel his forefather plied four thousand years back—it has not improved and the best brains of the country never troubled

to take any forward step in its development.

Our potter ples the same wheel, carves the same ornaments upon his pots as his forefathers used to do thousand years back. If any of our industrial art, of pre-historic days is represented to you in picture to-day you have no means to know whether the subject of the picture is of the present day or of days of yore.

In every walk of our industrial and commercial life no scientific brains were ever applied since the days of the *Rishis*. While these cry for scientific help we the educated few run after servitude.

How the world has progressed in the meanwhile. Pick up a bone in the jungles of South America and bring it to a scientist in London—he will tell you the animal it was in and where it was found because he knows the science of Zoology. Pick up a rock on the banks of a river in Siberia—bring it to a Scientist in New York—he will tell you what sort of rock it is, give you a classified

name and tell you all about that rock through his knowledge of Geology.

Science is largely based on facts and investigations but we stopped our investigations four thousand years ago and never troubled ourselves with these things except forming discouraging opinions, retarding habits.

But the triumph of science has led us to ask ourselves: Is it possible to apply our progressive knowledge of science to our old crafts; is it possible to use the methods of science with a view to build up our factory, our office, our handicrafts? We must have to think out new ways to deal with our old problems. We cannot be always thinking of getting back to our old day customs but must find out ways to progress over our antiquated achievements not by supplanting them, not by killing them, but by seeking real progress through application of scientific methods.

How can we do it? It is for the educated few to find out the way, to apply their scientific brains to our old crafts and point out every opportunity that our craftsman is missing. Once a contractor for brickwork happened to hear a university professor working out scientific methods in business. This professor was educated in London, Paris, Germany, Japan and the United States. His father was a great traveller and as a boy he was taken here and there to different countries. He had a natural bent for mechanics and he studied Engineering in five different countries. When a university professor by a fortunate accident he had a factory thrown on his

hand and he became Works Manager. And he applied his scientific knowledge so well that he subsequently became head of a big Railway management in America where he saved an immense amount of expense with regard to the operation of locomotives.

Now the brick-work contractor heard him talk of his methods, and doubted whether these can be applied to brick-laying. "It can't be done" said he "absolutely absurd. We have been laying bricks for 10,000 years, so how can you teach us to lay them better?"

The professor wanted to know the facts and they went out together, and began to watch some brick-layers. They saw and studied the motion of brick-laying, and found that the average brick-layer stooping down to pick up a 7 lb brick, incidently picked up 1 cwt. of himself. The brick-layer was stooping down 700 times a day, 700 times, 1 cwt. is about 35 tons; so he was picking up 35 tons of himself which can be avoided.

The contractor discovered that the average brick-layer took 18 motions to a brick. By motions study he reduced the number of motions per brick from 18 to 5 and increased the number of bricks laid from 700 to 3,200 per day. He had one labourer to wait on every six brick-layer; the bricks here, mortar there, all handy and the brick-layers were as fresh as anything after laying the bricks.

It was these men—who have their brains scientifically trained to a general experience—who can bring scientific methods in business—not the illiterate workers.

The forward step that our industries demand is to securing the highest percentage of results by applying the one right way—the scientific study of facts and the applications of the methods of science to business problems basing opinions on facts. For there is nothing so profitable as facts and nothing so dangerous as opinions.

And there is the opportunity of our university men whose power of observation has been cultivated to join with the artisan to develop a new method out of the old. The actual fact must be studied—we must know how we can turn the potter's wheel to double the product, how we can reduce labour to get best twist from our "charka," and must not depend upon practices and conditions that have never been investigated, methods that have never been standardised.

You don't SEE what you look at every day. This is a fact of eyesight, of brain sight, and so the first thing we have to do in scientific study is to really look at a job, see it, study it, investigate it, think about it. Here is the chance for our young men, fruitful of immense possibilities to yourself and to the country. Discard the traditional methods—methods that the illiterate workmen follow thousand of years. Gather the facts, analyse the facts, plan the facts, eliminate the useless ones, standardise as many as you can. And the first forward step as soon as taken will be followed by many until your new methods will revolutionise the old ones.

FLASH LIGHT OF CHANCES.

Mr. Editor, I have seen the first issue of the XVI Vol. of INDUSTRY with delight—it is a credit to the producer, to the wide awake staff that you control. I, as a devout reader of INDUSTRY, expect every issue of it replete with information and ideas applicable to the progress of my business—to every reader's business. There must not be a single issue which would not put every reader thinking for the progress of his business.

Indeed fifteen years have passed over the head of INDUSTRY. Your enquiry columns show that your readers are thinking harder to-day than ever before. Manufacturing of all sorts of useful articles are indeed increasing but sales organisation is proving rather a difficult problem. Goods do not sell themselves. In all sales policy always give service the first place: service to customers on a comprehensive scale has wider application to business success than even low prices. Good service to customers for the first time retains the patronage ever after.

I don't know whether business successes have ever been built on chance customers; on the other hand they depend on the customers who come back to buy more goods—and keep coming back. You may try to attract new customers but to hold the old ones is a far greater duty. And this can not be done merely by the exchange of honest goods at honest prices. It requires, in addition, unfailing attention to trifles, which is far more important to a businessman than to people in other walks of life. Quickness in making change or placing it in the customer's hand instead of throwing it on the counter, handing him half a dozen articles instead of one or two to enable him to make his choice, a salute with a kindly smile to a departing customer, especially if he makes no purchase are some of the trifles of tremendous import. They are small but, massed, they build up Business like coral-insects.

If you wish to have a successful and a happy life, you must build something. You must be creative. It is a law of this universe. It is our nature to build. To make something! Even your little child of four piles up his stones into a structure and then says—"Oh, Mother, come and see what I have made!" A man must build to justify his coming into a world where so much has already been done for him. When he builds, he pays the unborn what he owes to the dead. Talk about Trade and Commerce being merely a matter of money-making! What can possibly be more absurd! The money-making is incidental. The Companies that last, from one generation to another, are those that either create new values or render a necessary service to the public. Politics may be dominated by the talkers and the strategists but Business is not. It is dominated by the men who create and the men who serve. Abolish the politicians of a nation you may still have plenty of civilisation. But abolish the Businessmen and civilisation will be a fading memory of the past. Russia is the best evidence of this. That is why Business is superior to Militarism and Politics. Business creates, while Militarism destroys and Politics only takes from one person to give to another.

If you work for a man, in Heaven's name work for him. If he pays you wages that supply your subsistence, work for him; speak well of him, stand by him and stand by the institution he represents. Remember that an ounce of loyalty is worth a pound of cleverness. If you must vilify, condemn and disparage, why, resign your position, and when you are on the outside, damn to your heart's content. But as long as you serve, as long as you are a part of the institution, do not condemn it. If you do, you are loosening the tendrils that hold you in the institution, and with the coming of the first high wind you will

be uprooted and blown away and you will probably never know why.

If your business is small, don't pity yourself. I have often wished I owned a small firm rather than a big one. Big firms have big troubles. And the biggest trouble is to keep on being big. Once a firm grows big, it becomes old and stiff. It hardly grows further. It runs the danger of falling down. Few big firms make big profits. It need not be this. But in 9 cases out of 10 it is. Here is Mr. Paul, the biggest paper merchant, saying that he cannot make only a pice a ream profit. Here are two big Railway Companies striving with might and main to make 5 per cent. Here is Mr. Law, head of the biggest fancy goods house regretting over last year's loss of 80 lakhs. But look! how satisfied, how admiring is that customer doing business with the small firm! Yes, if you want quick deliveries you must go to a small firm, not a big one. If you want personal attention go to a small firm, not a big one. A big firm is very often too big to handle its own body. It has more bulk than muscle and nerve. Then again, the big firm has often very small men. The bigger the firm, the smaller the people who run it—people who spend most of their time in dodging responsibilities, people who are unfit for any work except that of their own department. But you! Why, you are your own Typist, your own Clerk, your own Accountant, your own Salesman. Nothing, indeed, can take the place of a live, keen, responsible, efficient man—the man owning the small firm. That is why you need not pity yourself if your firm is small. The small firm is making you a big man, and urging you, every hour, to make it big too. Listen to it. Strive to be bigger and bigger still with each new day. And carry with you your business. For the pleasure, the glory is not in victory but in the struggle.



Fig. 1. *Saccharum Munja*.

ECONOMIC GRASSES OF INDIA.

THE economic value of some Indian forest grasses has been laid stress upon by Mr. R. S. Hole in the *INDIAN FOREST MEMOIRS*. It is pointed out that these grasses are of considerable importance on account of the value of the economic products yielded by particular species. For example the Bhabar grass "*Ischoemum Angustifolium*" is a valuable paper material, Rusa Oil Grass, "*Cymbopogon Martini*" is the source of the valuable Palmarosa or Rusa Perfumery Oil, Munj, "*Saccharum Munja*" yields a valuable textile fibre and also a paper material and a host of others.

Now the primary importance of Indian forest grass lands depend on two facts: (1) their great value as grazing grounds and fodder yielding areas; (2) elsewhere they occupy large areas which might produce valuable forest.

In many parts of India suitable measures are taken in order to satisfy as far as possible the urgent needs of the people with regard to fodder. Large

areas of the greatest value as grazing grounds, or as areas productive of good fodder grass, are situated within the boundaries of the Government Forests. On the other hand, large areas of grass land exist in forests almost throughout India which are not needed primarily for the production of fodder and which have been for many years carefully protected from fires and grazing in the hope that they would soon become naturally reforested.

As the terms "steppe" and "savannah" are of value in the description of Indian forest grass lands their definitions are useful. Steppe is a treeless plain clothed with grasses and other perennial herbs while savannah is a grass land containing isolated trees. As an example of the latter the Munj grass formation which occupies enormous areas in Northern India may be cited. Areas of precisely the same type of grass land, e.g., composed chiefly of *Saccharum Narenga*, may be found



Fig. 2. *Saccharum Spontaneum*.

sometimes with, and sometimes without, scattered trees. The economic value of certain typical grasses found in the Dehra Dun valley and in the neighbouring tracts are cited below.

(1) *Saccharum spontaneum* distributed throughout India, Afghanistan, Burma, Ceylon, Arabia, Syria, Africa, China, Java, Philippines, New Guinea, Australia. Its vernacular name is "kaus," "kauśi." The leaves of this species are much used for thatching. This plant possesses considerable value on account of its capacity for fixing shifting sand and unstable soil.

(2) *Saccharum munja* is chiefly found in Northern India, in the Punjab and Upper Gangetic plain. Its vernacular

names are "munj", "munja," "sar," "sarkara," "ekar." This species is of great commercial value and is probably most widely known on account of the valuable fibre (called "munj") extracted from the upper, leaf sheaths of the flowering culm, which is used for cordage, mats, etc. For this purpose, as a rule, only the two uppermost leaves of the culm are utilised, as these have the longest sheaths. Watt says, "the much prized "munj" is strong, elastic and has a wonderful power of enduring moisture without decaying. It is extensively employed in the manufacture of



Fig. 3. *Saccharum Narenga*.



Fig. 4. *Imperata Arundinacea*.

cordage, ropes, the famed Delhi mats, and in the preparation of baskets, etc. "Munj" mats are largely produced in Allahabad, Agra, Delhi and are traded in all over India, and within recent years have begun to find their way to Europe."

The thin upper portion of the flowering culm (locally known as "sirki") is used for making winnowing trays, cart-covers, etc. The thick lower portion of the culm is locally called "bind" and is used in place of split bamboos for making screens (tatties) and in thatching.

The leaves are largely used for thatching and also constitute a valuable paper material. In exploring the possibilities of the fibrous grasses as paper materials Mr. William Raitt writes that *saccharum sara* or "muriz" yields an excellent easily bleached pulp, similar to that of wheat straw.

This species also has considerable value on account of its power of fixing unstable soil and of preventing the drifting of sand.

(3) *Saccharaum narenga* distributed throughout the Sub-Himalayan tract from Dehra Dun to Assam, Bengal, Central India and Burma. This is probably the commonest and most widely distributed savannah grass of sal forests—and is usually the dominant species. The culms and leaves are used for thatching, for making tatties (i.e. screens), etc.

(4) *Erianthus ravenae* found in Western Himalaya, Punjab, Upper Gangetic Plain, Sindh. Its vernacular name is "dolsar," "dolu." This species is



Fig. 5. *Aristida Cyanantha*.



Fig. 6. *Andropogon Monticola*.

not infrequently mistaken for *Saccharum Munja*, but is easily distinguished by its distinctly awned spikelets, the broader dark green leaves and hairy leaf-sheaths. The fruiting panicle also is usually browner in colour. The leaves of this species quickly decay and therefore are not of much use. The culms are used for making screens, etc.

(5) *Imperata arundinacea* is found in the hotter parts of India and ascending in the Himalayas. Its vernacular names are 'siru,' 'sirhu.' Like 'kaus' this species is liable to take possession of agricultural lands which have lain fallow and is then exceedingly difficult to eradicate.

The succulent white stolons are eaten by pigs and therefore may be easily eradicated.

In addition to its value for fodder this grass under the name of "lalang" has recently been favourably reported on as a paper-making material. The ultimate fibre obtained from this grass is very similar in most respects to 'Esparto' the yield of bleached fibre being about the same. This is a favourable indication inasmuch as "Esparto" is one of the best known and most useful sources of supply to the trade. The results obtained from the chemical analysis show that the grass is capable of yielding a good quality of cellulose, suitable in every way for the manufacture of paper. The leaves are largely used for thatching.

(6) *Triraphis madagascariensis* extends to Tropical Himalaya and Sub-Himalayan tract from Punjab to Assam, Burma. It is known in vernacular as "bansi." It is of some value on dry sandy, or gravelly, soil as a pioneer of better vegetation.

(7) *Aristida cyanantha* is distributed throughout Western Himalaya and Sub-Himalayan tract from Kashmir to Kumaor. It is known in vernacular as "sui", "suhui." The upper portion of the flowering culm with the attached panicle is cut off and several of these being tied in small bundles the latter are used as brooms.

This species is of considerable value as a pioneer on gravel and shingle banks which there resists erosion and gradually

improves the soil and prepare the way for better vegetation.

(8) *Andropogon monticola* is distributed throughout India, especially in

hilly tracts from N.-W. Himalayas. Its vernaculars are dhaulu, gurla, gorha.

The principal characteristics of the typical species of grass described in the above article have been summarised in the following table in which they are arranged in order according to their relative (1) capacity for growing vigorously in a dry soil, (2) capacity for enduring shade, (3) capacity for enduring bad soil-aeration and (4) capacity for withstanding the injurious effect of an early fire in December—February. The species with the greatest capacity for thriving in a dry soil, and for enduring shade, bad soil-aeration and fire, respectively, has been in each case placed first. Species joined by a bracket are believed to have an approximately equal capacity. With regard to the capacity for thriving in a dry soil, also, the duration of the culm is of interest; this has therefore been noted and it will be seen that the species able to grow well in dry soil usually have annual culms:—

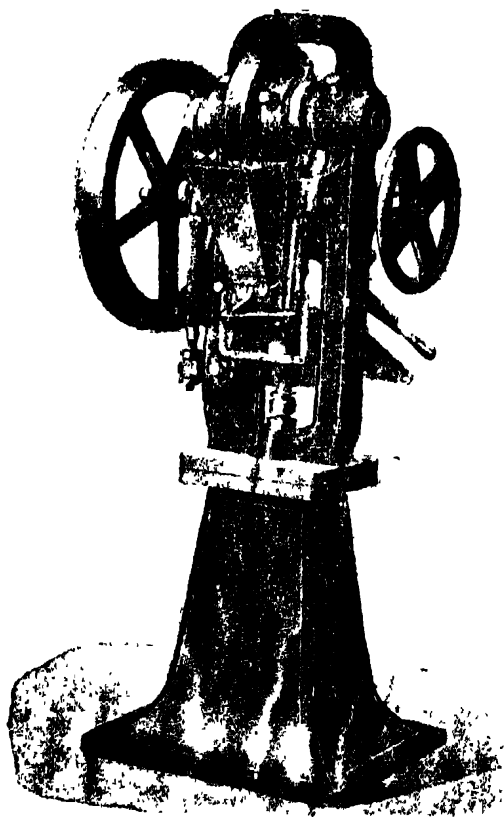


Fig. 7. *Erianthus Ravennae*.

Capacity for thriving in a dry soil	Duration of Culm	Capacity of enduring Shade	Capacity for enduring bad Soil-Aeration.	Capacity for resisting injurious action of an early Fire.
{ <i>Andropogon monticola</i> <i>Aristida cyanantha</i>		{ <i>Saccharum Narenga</i> <i>Erianthus Ravennae</i>	{ <i>Imperata arundinacea</i> <i>Saccharum spontaneum</i>	{ <i>Aristida cyanantha</i> <i>Triraphis madagascariensis</i> <i>Andropogon monticola</i>
{ <i>Saccharum spontaneum</i> <i>Triraphis madagascariensis</i>	Annual	{ <i>Imperata arundinacea</i> <i>Triraphis madagascariensis</i>	{ <i>Erianthus Ravennae</i> <i>Triraphis madagascariensis</i> <i>Saccharum Narenga</i>	{ <i>Erianthus Ravennae</i> <i>Saccharum Narenga</i> <i>Imperata arundinacea</i> <i>Saccharum spontaneum</i>
{ <i>Imperata arundinacea</i> <i>Saccharum Munja</i> <i>Saccharum Narenga</i> <i>Erianthus Ravennae</i>	Biennial	{ <i>Saccharum Munja</i> " <i>spontaneum</i> <i>Andropogon monticola</i> <i>Aristida cyanantha</i>	{ <i>Saccharum Munja</i> <i>Andropogon monticola</i> <i>Aristida cyanantha</i>	<i>Saccharum Munja</i>

GRANULATION

All material to be made into compressed tablets must be in the form of uniformly coarse powder before feeding into the machine. The process of con-



Tablet Making Machine. (Back)
(To be worked by power.)

verting powders and other substances into this particular condition is known as 'granulation'. This is usually achieved by moistening the powders with a suitable liquid, mixing, forcing the slightly damp mass through a sieve, which forms the granules, drying, and again sifting.

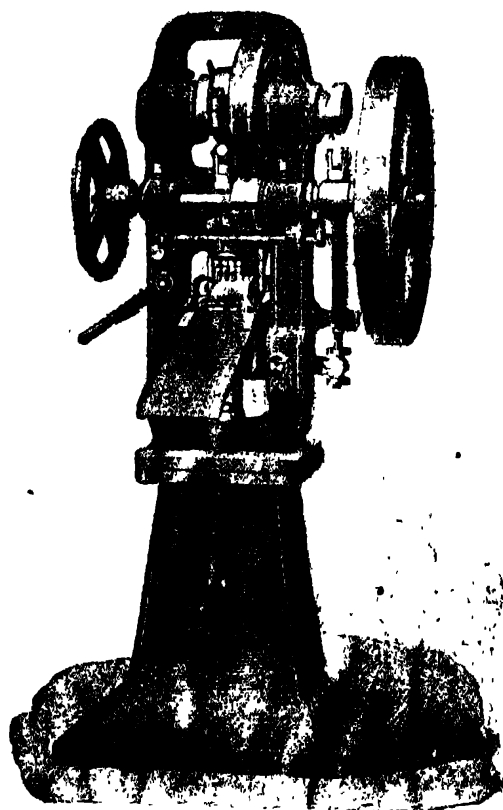
There are, however, a number of chemicals frequently used in compressed form which require no treatment other than sifting, and sometimes drying, before being compressed. On the other hand, substances requiring granu-

lation comprise the large majority of medicaments entering into compressed tablets. In order to produce compressed tablets which will possess the proper qualities medicaments entering into their composition must be mixed with certain excipients adapted to the needs of the particular substance or combination.

EXCIPIENTS

Now by the term excipient is denoted any substances other than the medicament, lubricant, and colouring agent, which enter into the composition of the tablet or pill. Excipients are classified under the following heads:

- (1) Moistening Agents: Water, alcohol.
- (2) Adhesives:



Tablet Making Machine. (Front)
(To be worked by power.)

Cane sugar, acacia, glucose, gelatin, etc.

(3) Bases:

Cane sugar, milk sugar, salt, dextrine, etc.

(4) Disintegrator:

Starch.

(5) Absorbents:

Milk sugar: magnesium carbonate.

PREPARATION

It is needless to point out that different ingredients are to be differently treated and prepared for the final operation.

(1) Chemicals are either crystalline or non-crystalline; soluble or insoluble. (2) Vegetable drugs should be in fine powder and require strong adhesives. (3) Among the pharmaceutical preparations are tinctures, extracts, resins, syrups, etc. (4) Volatile substances are solid or liquid. (5) Effervescent tablets are perhaps the most difficult of any to prepare and as many as three different methods are possible. Extreme care in regard to cleanliness as well as absence from mois-

ture must be observed; in compressing, the die and punches should occasionally be cleaned and oiled.

LUBRICATION

As few granulations can be readily compressed without the addition of some substance to prevent their adherence to the punches and die, the difficulty is obviated by substance known as Lubricants. For this purpose white petroleum oil, purified powdered talcum, and powdered boric acid are chiefly used.

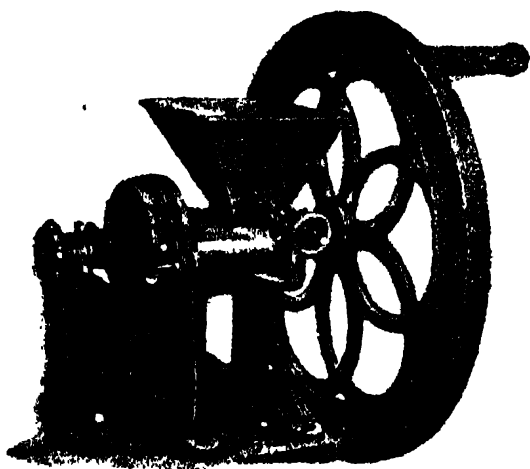
COMPRESSING.

Though the compressing machines found in the market operate more or less on similar principles they differ from each other chiefly in details. Also while the configuration of the driving mechanism vary with particular machines they all possess the following parts in common: viz., a hopper or funnel into which the granulation is put; and feeding-shoe that automatically fills the die, and pushes aside the finished tablets; a device for holding the die in position, a lower plunger, for holding and operating the lower punch, provided with an adjustment for regulating the weight of the tablets; and an upper plunger, for holding and operating the upper punch provided with an adjustment for regulating the hardness of the tablets.

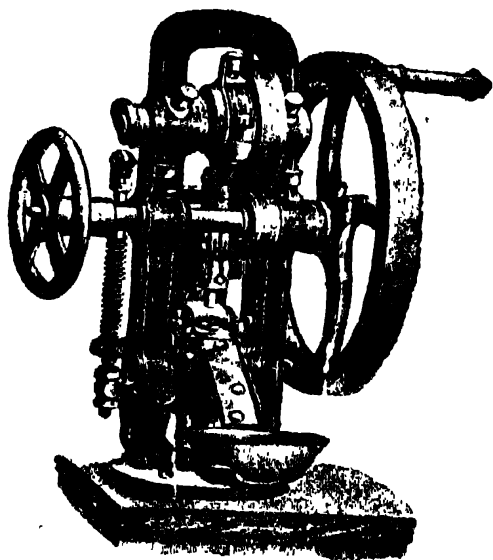
DIRECTIONS.

The following direction for operating the machine should be noted:

(1) The top of the die must be exactly flush all around with the table of the machine. (2) The lower punch must rest singly upon the bottom of its socket. (3) In adjusting the



Powder Mixing Machine.



Small Tablet Machine.

weight of a tablet the lower punch should be at or near its lowest point. (4) When locking the upper punch in place, it should project a short distance into the die. (5) All bearings of the machine should be kept well-oiled and all parts kept neat and clean. (6) When not in use punches and dies should be completely smeared over with vaseline.

TABLET-MAKING

Tablets intended for solution should be made thinner than those intended to be swallowed entire. The same remark applies to tablets which are to be coated. In adjusting the weight of small tablets a sufficient number to weigh at least ten grains should be placed in the scale-pan and the variation noted.

As to regulation of pressure, tablets which are intended to be dissolved in the mouth should be compressed hard, while all other tablets should be compressed just hard enough to withstand abrasion in handling. In colouring tablets vegetable colouring should only be used. Better results are obtained by colouring tablets light tints rather than deep shades. Finally the construction of formula is dependent for its correct treatment upon a general knowledge of processes employed, the application of excipients, and the physical and chemical properties of the ingredients of the tablets to be made.

GINGER CULTIVATION.

THE ginger-plant, *Zinzibar officinale*, belongs to the natural order,, Zinziberacea and is cultivated in the tropical regions of Asia, America, and Africa. It grows in all parts of India, and generally cultivated in garden, being sown about the commencement of the rains, and taken up in eight or nine months, though sometimes left in the ground for the following year. Ginger is sown at the commencement of the rains, in beds of about six feet square, and in a rich cultivated soil. The planting consists in dividing part of the green roots and is first soaked in a mixture of cowdung and water; it is then planted about two inches deep and about one foot apart; it requires a great deal of water and to be kept clear of weeds. When the stalks dry, the ginger may be taken up, although it is sometimes left in the ground for a couple of years. It is better for remaining twelve months, and must be watered during the dry season. The stem reaches generally three or four feet in height, and is renewed yearly, while the root, which is the part known as ginger, botanically termed a rhizome, is biennial. In Jamaica, the roots are dug up in January or February when about a year old and after the stems are withered. They are well washed, freed from dirt, and, in some cases, especially with the better kinds the epidermis or outer coat is stripped off, and hence the division of ginger into white, scraped or uncoated, and into black, unscraped or coated. In estimating the quality of ginger, a

variety of particulars have to be taken into consideration, as whether the rhizomes are coated or uncoated, their form, colour and consistence.

Ginger roots of good quality have no epidermis, are plump, of a whitish or faint straw-colour, soft and mealy in texture, with a short fracture, exhibiting a reddish, resinous zone round the circumference; the taste should be hot, biting, but aromatic.

Ginger roots of inferior quality are frequently coated with the epidermis, are less full and plump, often contracted and shrivelled, of darker colour, being of a brownish yellow, of harder texture, termed flinty, and more fibrous, while the taste is inferior, and less aromatic.

The principal uncoated sorts are:—

Jamaica ginger. It is an uncoated pale sort; and when of fine quality, occurs in large bold, fleshy races, which cut soft, bright and pale coloured. Inferior samples are small in the race, darker-coloured, more or less flinty and shrivelled.

Uncoated Malabar Ginger. It resembles Jamaica ginger, both in external appearance and flavour but has, externally, more of a brownish or reddish tint

Uncoated Bengal Ginger. It is an uncoated sort, darker than Jamaica ginger; it is not so large as the uncoated Malabar sort, and is harder and darker.

The chief coated gingers are:—

Barbadoes Ginger. It is a coated sort, in short, flat races, which are darker, coloured than Jamaica ginger, and are covered with a corrugated epidermis.

Malabar Ginger. It is a coated dark and small sort.

Bengal Ginger. It is a coated or unscrapped dark sort, which cuts flinty and brownish, but is plumper and less thorny than common Malabar ginger.

Sierra Leone Ginger. It is a coated sort, the races being generally larger, less flat and less plump, than those of the Barbadoes sort which in other respects they resemble.

Besides the two kinds of ginger above noticed what is called green ginger consists of soft and juicy rhizomes with buds, and appears to have undergone but little preparation beyond picking and washing.

The young shoots put forth every spring by the perennial rhizome are used in the manufacture of preserved ginger. Dried ginger of good quality soft and mealy, may, by the following process be converted into excellent preserved ginger. The rhizomes, selected with care are to be immersed for three or four weeks in very weak syrup, scarcely stronger than sugar-and-water to which a small portion of the carbonate of potash has been added; this addition being made to give them a fresher and greener tint, and also to assist in softening them. As soon as the ginger has become sufficiently soft, it is put up in very strong syrup of white sugar.

• TORTOISESHELL ARTICLES.

TORTOISESHELL, as we commonly mistake it, is not got from the tortoise, but is the shell of the hawk's-bill turtle. This turtle is found in abundance in the seas of the West and East Indies and in other tropical seas as well. Tortoiseshell has a great demand, and we find many articles of that material in the Indian markets. But real tortoiseshell is very costly and to suit our purses large quantities of imitation tortoiseshell articles are coming in from America and Germany. We can have an idea of the price of real tortoiseshell-made goods by noting that a hair-comb will cost from about Rs. 20 to Rs. 25 while the knob of plain yellow shell on a hair-pin will be worth about Rs. 10 to Rs. 15.

The hawk's-bill turtle has a hard shell with a number of plates which are commonly known as blades. The true shell must resemble horn and ought to be mottled. Heat is applied to the bony base holding the blades firmly and easily removed by means of a thin knife.

To prepare the tortoiseshell, we first put it in boiling water to soften it. But great care must be taken so as not to keep it in the water for too long a time as it will spoil its colour. A small quantity of salt added to the water prevents discoloration but here also great care must be taken not to put too much salt as it makes the material brittle.

In the manufacture of spectacle rims etc., the shell has at first to be cut into the required shape and the two loose ends welded together. This material has the property of welding itself if it is prepared properly. Two edges of the material are well bevelled and pressed together by means of a small press and put into boiling water. The press is

from time to time screwed up tighter till in a few hours the two ends are joined without injury to the colours or the shell itself. Excess of heat will invariably deepen the colour of the shell even to blackness.

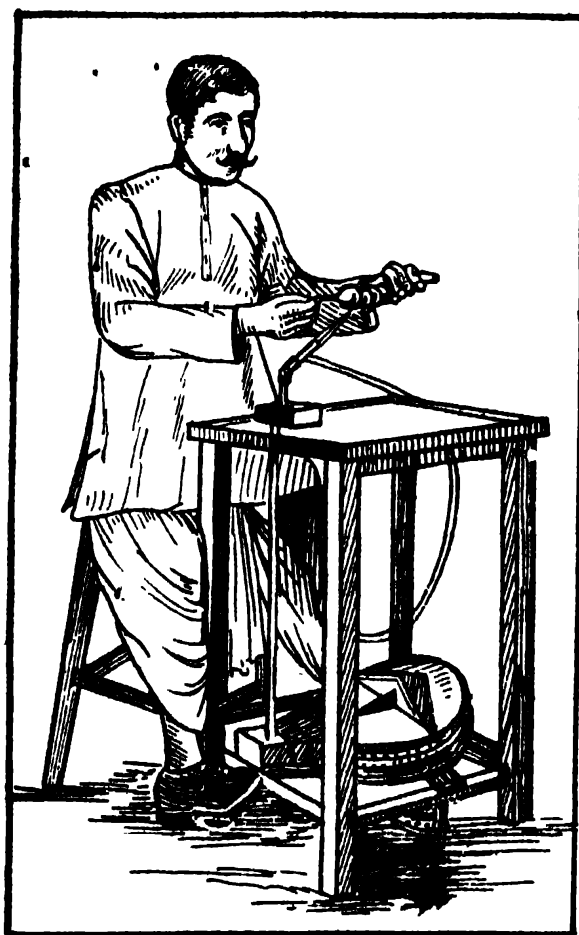
Tortoiseshell boxes are manufactured by having the material cut to any desired size in the flat, and placed in a mould and lowered into boiling water. In about half an hour or an hour the box will be complete and the article can then be given the finishing touch on the lathe. Boxes can also be manufactured by pressing tortoiseshell dust and chips already softened in boiling water and put into the mould. But this article will be inferior in quality and the substance nearly opaque. Colouring matter also may be added discriminately.

To inlay tortoiseshell with gold, silver, etc., the ornamental pieces are pressed into prepared shell. First the tortoiseshell must be softened and the pieces ought to be pressed into the shell and the whole thing put in a press and tightly screwed down. The press with the shell and ornamental piece must be lowered into boiling water for a short time and should be suddenly plunged into very cold water. Then the ornaments will stick on perfectly and the surface has only to be smoothed and finished.

The formula for a cement to mend broken tortoiseshell-made articles, quoted below will be found useful. "A cement for mending tortoiseshell is made by putting some Canada balsam in an oven and heating it until, when allowed to cool, it becomes hard. When required for use, remelt it by gentle heat and apply to the surfaces to be joined. Wire the parts soundly together and leave for 24 hours. On removing the wire any excess of balsam can be removed with a sharp knife."

By Mr. R. S. Padmanava Iyer.

THE ART OF GLASS BLOWING—I.



I. Glass Blowing Operation.

By mastering the art of glass-blowing a small industry can be built up for the manufacture and sale of a variety of glass articles chiefly laboratory requisites. In the present article the writer endeavours to give some practical hints of procedure but efficiency can be gained in this line only through practice.

TOOLS AND ACCESSORIES.

The tools, accessories, materials required are:—

(1) Glass tubing in different lengths and of various sizes. Generally the measurement of the diameter are $3\frac{1}{16}$ in, $\frac{1}{2}$ in, $5\frac{1}{16}$ in, and $\frac{3}{4}$ in, etc.

(2) Glass rods.

(3) Sharp triangular files.

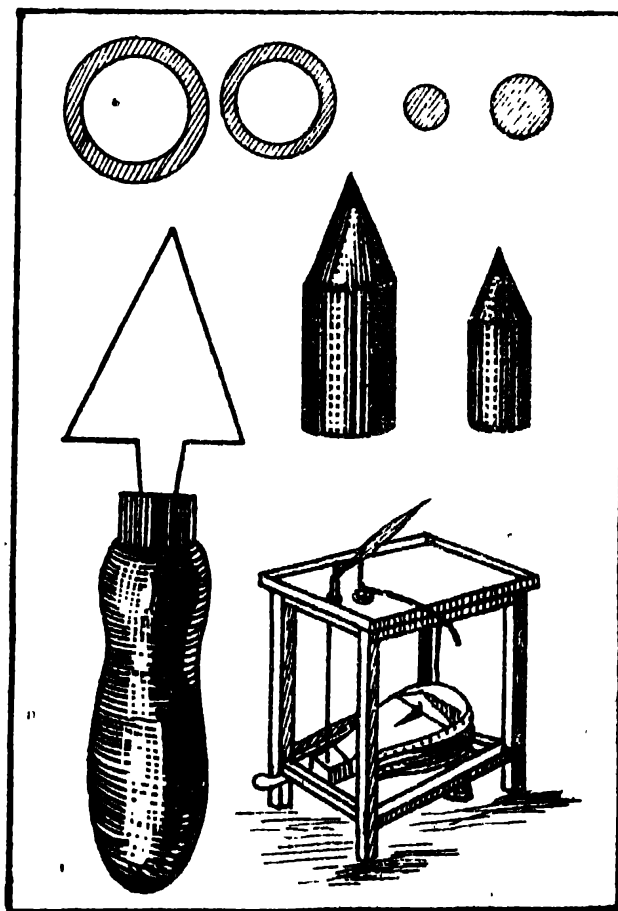
(4) A triangular piece of sheet copper mounted on a wooden handle.

(5) Conical pieces of charcoal of various sizes sharpened to a point.

(6) Beeswax.

THE BLOWPIPE.

The chief apparatus for actual working is a blowpipe with taps attached for both gas and air supply, so as to facilitate the regulation of the flame; pieces of rubber tubes for gas and air supply and



II. Cross Section of rods and tubes; Pointed charcoal; The Operating table; Glass cutting appliance. (From top to bottom.)

a pair of foot-bellows. In places, however, when there is no possibility of gas connection the purpose can be served by spirit lamps or acetylene flames. The blow-pipe should be placed upon the edge of a rather low bench, the bellows being upon the floor. The worker should take his seat on a stool directly in front of the blow pipe.

THE FLAME.

A few notes on the regulation of the flame are necessary here.

(A) When the gas is only slightly turned on there is a small flame. On blowing gently a long fine pointed flame is obtained. This is very hot, but only local heating of an object is possible with it. This is technically known as 'the small flame'.

(B) On more gas and air being admitted, a large non-luminous flame results. This flame is not so hot as the last one. It, however, heats more gradually and over a much greater area. This flame is the one most often used. This is technically known as 'the large flame'.

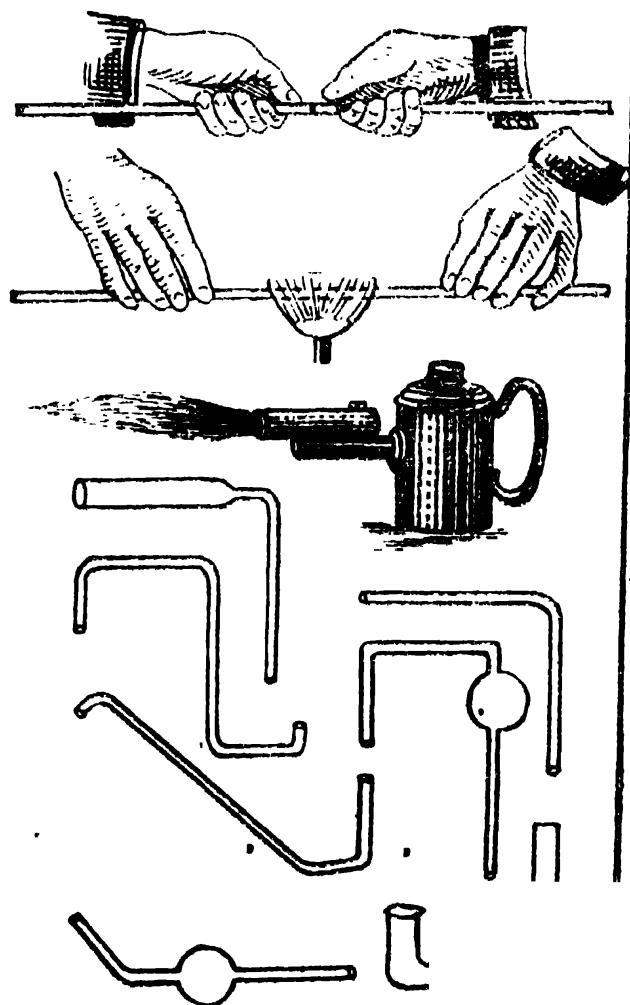
(C) When the blowing is stopped a large, luminous, very smoky flame is obtained which is very useful of annealing hot glass. It cools objects gradually and covers them with a non-conducting coating of carbon or soot, which ensures their protection from current of cold air. This flame is technically known as 'the smoky flame'.

Of the different class of glass tubes, soft soda glass, lead glass and hard glass, the first is best fitted for ordinary work. In order to ensure good results it is

necessary that the whole of the tubing should of the same kind of glass. Moreover good glass tube should be free from bubbles, knots, and parallel lines.

CUTTING GLASS TUBE.

Different methods are to be adopted for different sizes. For the smaller sizes of tube make a clean file mark at the point to be severed; take the tube in both hands, place a thumb upon each side of the mark and pull slightly in a downward direction; the tube should



III. Cutting glass; Bending glass; Blow-lamp; Bent tubes. (From top to bottom.)

sever clean around. Large sizes may be cut by making a file mark as before and bringing this part down on the edge of the bench sharply; this is generally found successful.

BENDING GLASS TUBE.

For this purpose take a piece of tubing 8 inch long: hold it in the flame and rotate it slowly; in a short time it will be found that the glass is sufficiently soft to bend with a very little pressure.

ROUNDING THE ENDS OF A TUBE.

above process, hold one end of the tube in the large blowpipe flame for a few minutes, turn about a little until the sharp edge is destroyed by fusion, withdraw, and treat the other end similarly.

SANDAL WOOD OIL INDUSTRY.

PEOPLE who do not know the uses and advantages of the Sandal Wood Oil in the scientific world are rare. It is a very valuable oil having a strong pleasant smell and fragrance. There will scarcely be a house-hold among Hindus where a piece of sandal wood is not kept, for in religious ceremonies and marriages sandal wood paste is daubed on the hands and bodies of the hosts, guests and partakers. Sandal wood (*Santalum Album*) *Manchi Gantham* is known from time immemorial. Its economic and ceremonial value dates back to King Solomon. These trees are grown in tropical countries and Southern India is the home of its cultivation and industry. This oil industry can be undertaken

by small capitalists as a cottage industry with best results.

Unless the natural raw materials which constitute the potential wealth of India are converted into manufactured articles of use the national prosperity cannot be attained. To stop the drain of our money running into foreign lands the time has come for the popular leaders to start a propaganda work among the villagers to revive and start new industries.

India always had foreign competition on account of which she is suffering a great deal. Seeing how Sandalwood oil industry is taking a firm stand in India artificial oils are being imported at a cheaper rate. Originally Sandal oil used to be imported from Germany and Japan in large quantities but now-a-days there are so many mature trees in India that nearly 800 tons of wood are used annually in the Mysore State alone where there are two factories, one in Mysore and another in Bangalore. The Indian Institute of Science of the latter place, State Institution, is working much for the scientific improvement of India. The knowledge of science either elementary or advanced; either little or great is required in all industries, let they be small using hand power, or big using machinery and steam or electric power. The educated manufacturer knows that science is helping him on the other hand the unprogressive villager proceeds ignorantly.

The following account briefly refers to the manufacture of Sandal oil as home industry with a little capital. The process of manufacture is simple and the

oil is procured from the wood by distillation. The root also yields a large and fine quantity. In gardens and even in back yards these trees can be grown. In the south the wood is sold @ Rs. 1-8 a viss of 120 tollas. In the first case the trunks are sawed into pieces and the white or sapwood is rejected thus the heart wood is ready for cooking or distillation which is cut into small chips. In Mysore these are cut into blocks of about 12 ins by 4 ins by 1 ins. These chips or blocks are passed through iron rollers and crushed well into pulp. These rollers are 6 inches in diameter and nearly of the same height (8") with oblique grooves placed side by side fixed firmly into the ground connected with a strut with arrangement to receive a supply of water, to which a long pole is attached and turned by a bullock power. At the base of the crusher a long tray is placed into which the pulp drops and runs into a pit where it is collected. These can be purchased for a small sum from any machine manufacturers. Village women makes the pulp by pounding with the help of an ordinary pestle and mortar.

The pulp is well minced with water and heated in a thick vessel by which time oil begins to appear on the surface. The contents are passed into another vessel, boiled again and the oil is skimmed off. The oil so drawn is again boiled once or more times to make it thoroughly pure and concentrated when it attains a bright golden colour.

The distillation process is as follows:—A big earthen pot with a

circular mouth is used for the still and is generally 2 to 3 feet in diameter. In the pot the chips are placed and water is poured to cover them when the mouth is closed with clay from which a tube runs fitted to a central hole in the lid into a reservoir generally of copper kept cool by a supply of cold water. This is a simple still. On the ground a pit is dug to burn ordinary fuel and the waste from the above wood. The burning takes place for nearly 8 to 10 days and water is added into the still as being evaporated until the whole oil is extracted.

The oil yield is 3.5 per cent. or nearly 12 ozs. per maund of wood. The oil is transparent and of a pale yellow colour. It has a resinous taste and a sweet peculiar smell. The oil is sold at Rs. 24 a lb failing to give a clear estimate as to the working expenses the ordinary manufacturer reports a profit of nearly Rs. 4 on a lb.

Before closing let me cite a few uses of the oil. The perfumer realises the greater factor as it is used primarily as a perfume either for toilet or on ceremonial occasion. This is widely used as an adulterant chiefly in the otto of roses and serves as a basis of natural and artificial essence industry on account of its strong lasting fragrance. It is also one of the main ingredients of scented hair oil as also of many floral extracts. In medical application it is gaining wide recognition. This is used internally for gonorrhea and externally as an unguent for itches.

By Mr. E. Lakkaraju Naidu.

Biri Making.

(By a Practical Expert)

BIRI making is a small industry which is carried on almost everywhere by common people. The art is not difficult to master as the procedure is not complicated. One can easily learn to make biris simply by observing the manufacturers for a couple of hours. The implements required are a pair of scissors, some thread preferably dyed; a wooden box with a bottom of wire gauze; a furnace burning charcoal or coal; bamboo trays, etc. The ingredients are tobacco mixture and wrapping tobacco, the former is generally prepared from the "nepani hindusthani and gujrati" varieties with various scents while the latter is invariably furnished by 'tendoo' leaves. These leaves are derived from the 'Tendoo' tree which grows wild in Nagpur and elsewhere. Its botanical name is *Diospyros embryopteris* and it is known in the vernacular as 'gab', (Beng.); 'tendu' (Hindi) 'gusvakaidu' (uriya); 'timbiri' (Bom-bay); 'tumbica' (Tamil); 'tumul' (Telegu). These are collected and sold in bundles. In making them ready the bundles are steeped in water; strained after a time and cut to size. These serve the purpose of the wrapper. As for the contents suitable tobacco is shredded into fine chips, put inside a wrapper and rolled into a conical shape. The tips are tied with a thread and the ends are slightly singed. The biris are put for sale in packs of 25 each. Biris are of two kinds, common and scented. Needless to point

out that while the former are cheaper, the latter are more relished.

The only appliance of importance required in this industry is a wooden box 2 cubits high, 2 cubits broad, and 3 cubits long. It shall have no cover either at the top or at the bottom. Make another wooden frame of the same length and breadth but only half a cubit high, with a wire gauze fixed at the bottom and with a covering lid at the top.

This apparatus is required to bake the 'biris' after they are made. For this purpose an oven with fired coal is placed inside the first box. The second box is placed on the first and serves the purpose of a hot chamber. The biris are put in this second box in bundles with the broad-side downwards. The lid is closed down for a while and the biris are ready when the ends become brownish in appearance.

The readers will do well to refer in this connection to the article on Tobacco for Hookah which appeared in the October issue (1924) and specially to the explanatory notes therein.

COMMON BIRIS.

I

Proceed as above with choppings of 'nepani' tobacco No. 1.

II

Proceed as above with choppings of 'nepani' tobacco No. 2.

III

Proceed as above with choppings of 'nepani' tobacco No. 3.

IV

Proceed as above with choppings of 'nepani' tobacco No. 4.

V

Proceed as above with choppings of 'gujrati' tobacco No. 1.

VI

Proceed as above with choppings of 'gujrati' tobacco No. 2.

VII

Proceed as above with choppings of 'gujrati' tobacco No. 3.

VIII

Proceed as above with choppings of 'hindusthani' tobacco No. 1.

IX

Proceed as above with choppings of 'hindusthani' tobacco No. 2.

SCENTED BIRIS.

I

Take dust of 'nepani' tobacco No. 1 and perfume with liquid musk.

II

Take dust of 'nepani' tobacco No. 1 and perfume with otto of musk henna.

III

Take dust of 'nepani' tobacco No. 1 and add as scent otto of Damascus roses.

IV

Take dust of 'gujrati' tobacco No. 1 and add a little otto henna.

V

Take dust of 'gujrati' tobacco No. 2 and mix the residue of 'keora' to scent.

VI

Take choppings of 'hindusthani' tobacco No. 1 and mix a little muzma for perfume.

VII

Take choppings of 'hindusthani' tobacco No. 2 and mix a little otto of 'chameli'.

VIII

Soak 'pulopata' tobacco in water for 4 hours; throw away the water and reject the stalks and fibres of the leaves. Then cut them into fine pieces with scissors and dry in the sun. Add a little otto of 'khus'.

IX

Proceeding as above with 'hingli' tobacco, besmear it with rose water and dry. Repeat for 5 or 6 times.

X

Take 'motihari' tobacco of yellow colour: reject the stalk and ribs; and chop with scissors. Soak them in rose water for a whole day and dry in the sun. Then proceed to make 'biris'.

XI

Take 'pulopata' tobacco of good quality, reject the stalk and ribs; and chop to fine pieces with scissors; soak them in keora water for 24 hours; dry them in the sun and proceed to make biris.

XII

Take 'hingli' tobacco of good quality, reject the stalk and the ribs; soak in otto-de-rose virgin; cut into fine chips with scissors and proceed as above.

XIII

Take chopping of 'motihari' tobacco of good quality and yellow variety. Macerate saffron with rose water, mix with the above and proceed to make biris.

XIV

Take choppings of 'hingli' tobacco, and mix a bit of musk and otto of rose. Proceed as above.

The prices of biri leaves vary considerably. Quotations for the varieties referred to above are given only.

		per md.
		Rs. Rs.
No. 1	Nepani tobacco	52 to 54
No. 2	" " "	46 " 48
No. 3	" " "	40 " 42
No. 4	" " "	26 " 28
		per md.
		Rs.
No. 1	Hindusthani tobacco	28
No. 2	" " "	26
No. 1	Gujrati tobacco	30
No. 2	" " "	28
Biri leaves per pack of 1,000		Rs. 28
to Rs. 32.		[Rights Reserved]

ART-CRAFTS: A NEGLECTED FIELD

THE co-operative movement aims at directing economic development towards social ends. For, it is, in essence, a social effort, meant for social ends. If that is so, the pre-occupation with its economic aspects is necessary only in so far as it tends to serve those ends. The means of production, the margin of profit, the system of distribution and sale, the conditions of housing and employment, the facilities for education and recreation require thus a treatment different from the treatment by those whose point of view is tinged by conceptions and economic practices that do not of set purpose accept the social aspirations of the community as an ultimate end. The member of the community, say, the economist, who is not interested in co-operative work is free to experiment with economic forces and practices that might or might not be of general advantage to the community. His efforts are, at the best, an indirect advantage to the general community. He may or may not regard his activities as an individual concern. The incentive which moves him is not necessarily social. He need not even actively experiment or speculate. He may, as he usually does, submit passively to the existing state of affairs. But the outlook of the co-operative worker should be totally different. He is not free to experiment with economic forces and practices that have not a distinct social value. The incentive which prompts his activities is the social welfare of the community. His efforts are directly and deliberately aimed towards the social

advancement of the community. His conduct is, therefore, not an individual concern. He cannot thus passively submit to the existing state of affairs. He must constantly and actively experiment with and examine the existing conceptions and practices. He must examine them for finding out their social values. He must experiment with them in order to find out their inherent possibilities for social adjustments. The fact that certain conditions, conceptions, values or practices exist is not the final answer for him.

The suggestions outlined here are primarily for the worker whose outlook I have attempted to describe. I have done so for two reasons. The success of the movement depends, in the first place, on the outlook and conduct of the workers it is able to recruit. Secondly, if the attitude of the worker who approaches the suggestions sketched below remains undefined, there is every likelihood that he will fail to understand their true significance. The co-operative worker who is eager to discover the human elements or rather the human values in labour, methods of production, conditions of employment and housing will, if he examines them carefully, find in the ancient and the existing art-crafts of this country almost unlimited and assured scope for the economic adjustments that would lead directly towards social advancement. Let it be clear. It is not the intention here to advocate the resuscitation of what are usually recognised as the "handicrafts" or as "cottage industries" This is a plea mainly for the handicrafts that are produced for

their artistic qualities. They may be thus recognised as the art-crafts. Textiles, work in metal, wood or stone, almost every article formerly in daily use, jewellery, carpets, rugs, embroidery processes of book illustration and printing, household furnitures and fixtures, every object in which the element of design, artistic manufacture, colour or shape predominates may be recognised as an art-craft. It was the artistic element, the distinction of design, that had for centuries secured for India and its industries universal recognition and supremacy. The art-craftsmen who impressed the indelible mark of artistic genius on their work were, at the time, right recognised and respected as one of the greatest national and economic assets. Their neglect in modern times has destroyed the supremacy which their work had secured for the nation. The art-crafts are approaching extinction. The economic loss, the unemployment of the art-craftsmen, the import wholesale of shoddy goods from abroad and the servile dependence for artistic ideas and design on foreign "experts," consequent upon the thoughtless manner in which the art-crafts and the inherited skill of the art-craftsmen are ignored in conventional estimates of national wealth, need not be detailed. Small-scale industries, if the art-crafts may be so described, have their place in national economics. Their importance is, no doubt, beginning to be realised. But in the absence of a collective outlook and of well-planned efforts it is apparently vain to expect to regain for them the

place they once had in popular life. The artistic faculties and the distinctive craftsmanship essential to the art-crafts can emerge as a permanent achievement only if educational institutions, the legislature, adequate means of popular instruction and of publicity combine to render the stimulating assistance they need.

The assistance of the co-operative worker, I have in view, would be thus invaluable. The co-operative worker is not, should not be, obsessed with conceptions of large-scale industries and organization. It is true that he has, till now, made no practical attempts to define or assert the place of small-scale industries in the economic life of the nation. But the conditions in the country and the nature of his mission should have indicated to him the advantages to the nation—unable to utilise its full or intrinsic credit or to obtain or refuse with benefit outside capital—of industries which could, within a comparatively short period, be built up by co-operative effort with the aid of local talent and capital. The loss to the country due to inadequate supply of technical assistance necessary for large-scale, imported modern industries has been frequently pointed out. But the loss involved in the wastage of local inherited talent remains practically unnoticed. It is not yet proved that the artistic skill and hereditary talent, for instance of the craftsman who has been manipulating wood blocks for the designs once beautifully reproduced on cotton prints, with proper assistance utilised also for book

illustration, would be an economic disadvantage.

The small-scale industries would, moreover, tend to decentralise or counteract the concentration of large-scale industries which spread their dehumanising influences and conditions over increasing and over-populated urban areas. And modern conditions elsewhere make it probable that the co-operative worker is aided by electricity. Its more general use and the distribution of power at cheap rates would usher in, in all probability, the human conditions we have learnt to associate with the workshop, the apprentice and the crafts practices of old. However that may be, the co-operative worker cannot remain indifferent, particularly in a country like India, to the requirements of the rural or rather the agricultural districts. It should be his business to see that the towns do not always swallow up the best resources and talent available in the districts. The drain is, fortunately, beginning to be recognised as a serious problem. But his protests would be futile if the co-operative worker is not able to provide in the districts employment suitable to the available skill and talent. The employment that he seeks to provide to the man of skill and talent in the districts must, therefore, be sufficiently attractive as a compensation. He cannot allow the production of wares which would place the rural worker at a disadvantage. The worker is bound to be at a disadvantage if he is employed in producing articles which could be turned out better by mechanical means, stand-

ardisation, mass production and large-scale enterprise in big industrial towns.

I have, therefore, endeavoured to define the place of small-scale industries as an enterprise of national importance, and the co-operative worker before he proceeds further must know the industries now left untouched for small-scale enterprises, the industries that could be developed by talents and means available locally in the districts. The use of the terms "handicrafts" and "cottage industries" employed at present rather indiscriminately has been deliberately avoided as it is my intention thus to indicate the precise stage where and the precise objects with which the co-operative worker might begin his experiments in economic adjustments that would lead directly towards social advancement. The field for small-scale industries is, under the pressure or rather the tyranny of ruthless competition, uncontrolled production and greed, becoming narrower every day. What may be regarded as "handicraft" to-day may be to-morrow usurped as a machine-craft by the monopolising proclivities of the age. What we might be hitherto thinking of as "cottage industries" might soon turn out to be urban industries. The ease with which these could be standardised and subjected to mass production adds another uncertain element. So that the art-crafts by their very nature seem to be the only kind of "handicrafts" that could, despite the overwhelming obstacles, retain their future more or less intact. For, their value depends not so much on quantity as on quality, not on standar-

disation but on their distinctive artistic manipulation. The artistic talent and the skill may from time to time create new objects for their employment. But it would be an unknown phenomenon in the history of human advancement if artistic impulses are to be confronted with a plea for their extinction. So long as human beings retain their human individuality and their human craving for beauty in surroundings, so long will the demands for the art-crafts remain. Even now the indifference to the art-crafts does not necessarily indicate the absence of the human craving for beauty in daily surroundings and life. It only vividly recalls the over-powering tyranny of the economic forces that have been allowed an unchecked sway. It is at present the fate of almost every human demand to meet with the same contemptuous recognition.

It is for the co-operative worker to substitute respect for the present contempt in the recognition of human demands. He is sure to be encouraged when he realises that the substitution would bring him straight to methods of production and organisation essentially co-operative. The art-crafts of India still reveal, however imperfectly or in varying degree, the existence of the co-operative associations, institutions and guilds that have hitherto kept up their distinction and vitality. These could be and should be utilised. They must begin to function once again. They would do so with greater ease and rapidity and therefore more effectively than the newer forms of extraneous

institutions imposed without intelligent appreciation of existing means and conditions. But the co-operative worker must be warned against the temptation of rigid uniformity, facile organisation or hasty enterprises inspired by random data or insufficient information. What may be the best for one country need not be the best for another. What may flourish in one town need not flourish in another. What may be good for the town need not be good for the country. What may be congenial soil for one art-data or insufficient information. What talent or skill is available in one place may not be available in another. Practical measures for the revival of the art-crafts must, therefore, be based on an impartial study of local conditions. I should, therefore, like to suggest the institution of a survey of the existing art-crafts and of the old art-crafts that could be revived with advantage. Such a survey would not be altogether without a precedent. Birdwood had laboured in the same field. But his surveys aimed to save the art-crafts without saving the art-craftsman. We have to save both. His surveys were, moreover, concerned mainly with the past. We have also to think of the future. The survey would supply reliable information and data and serve as a scientific basis for fruitful experiments. The survey might be started from a limited field in such centres as Surat or Ahmedabad. It would certainly be a decided advantage if the assistance of the Co-operative Institute, the Co-operative Department and the Depart-

ment of Public Instruction could be secured for the purpose.

The suggestions are based on no theory or traditional point of view but have "sought to be thoroughly objective," so that "clearer thought may be brought to bear on the situation." This was the attitude with which a committee composed of the "National Society for Vocational Education" and the Department of Education of the State of New York some time back tackled a similar problem in America. This must be our attitude as well. Our national life is still fortunately not so hopelessly addicted to the economic conceptions and practices that have ruined humanity in Western nations. We must, therefore, take up the regenerating work before it is too late. The Holyoake Institute in Manchester has, one remembers as a typical attitude, left a gap in the message supplied by the decorative treatment of its public hall. Let India fill the gap. Let her art-crafts provide the inspiration.

BOMBAY CO-OPERATIVE QUARTERLY.

HENRY FORD'S GIGANTIC WORKS.

IT will be interesting to the readers to know something of the gigantic works where the Ford car is built. A vivid description of Henry Ford's big works at Detroit has been furnished to a foreign exchange. The following facts and figures culled from it will be found interesting.

In June, 1924, Ford made his 10,000,000th motor car. Most of these cars are still running. Their total horsepower is 229,000,000. This is equal to the strength of 75 Niagaras.

There is one trunk line conveyor in the Ford Works which is more than a mile long. It carries castings, forgings;

parts, etc. It is operated by 12 motors and does the work of 70 men.

There is one Inspector to every 33 workers. The vital parts of the car are tested after every operation. If there is the slightest flaw, the defective part is sent to the Salvage Dept.

The production cycle is now only 14 days. This means that it takes 14 days to change raw material into a finished motor-car. Once, to show what could be done, the iron ore that arrived at the Works Monday morning, was made into a car and sold to a customer by Thursday evening—4 days.

About 90 per cent. of Ford's machines are standard; and the rest are made by the Ford mechanics. All told, there are 35,000 machines in the Ford Works.

The stores stand at £8,000,000. Several years ago they stood at £12,000,000; but they were reduced by a better buying system and a quicker railway service.

The most wonderful machine in the whole Works is one which drills 47 holes on 4 sides of the motor simultaneously.

In the artificial leather building, there are no lights inside. All are outside, to prevent fires, as so much alcohol and benzol are used. About 80,000 yards of leather cloth are made per day.

Ford has a Photograph and Film Dept., selling films at a low price to schools and colleges. No doubt any British firm can buy these films, showing processes, etc. There are 38,000 photos in the library.

More than 500,000 railway vans are used in a year, and the freight bill, in 1924, was £30,000,000. All cars are packed, in parts, in railway vans. Ford has no warehouses for finished goods.

Ford pays nothing for coal for power purposes, as he makes a profit on every ton by extracting all the by-products.

His coal costs him 20/- a ton delivered, and he gets 60/- worth of coke and by-products per ton.

His foundry is the largest in the world. It covers 30 acres. It pours 2,000 tons of castings every 24 hours.

His power-house produces 500,000 h.p. He uses distilled water to prevent boiler scale. His 8 lofty stacks never smoke. There is no dirt and no dust. There is one shovel--nickel-plated and mounted as an antique. It is a relic of the barbarous age of hand labour.

Ford is making 2,000 barrels of cement a day out of his blast furnace slag. This slag contains 1 per cent. of iron, which is recovered by magnets.

He makes plate glass in a continuous unbroken sheet, that feeds off upon a moving platform 442 feet long. All glass-workers said that this could not be done, so Ford sacked the lot and did it with men who knew nothing about glass-making. There is not one glass-worker in the glass-factory, and it produces 12,000,000 square feet a year.

The Johansson steel gauges are now made by the Ford Company. Mr. Carl E. Johansson himself is one of the Ford engineers. These are the most accurate gauges in the world. Ford has a monopoly of them, but he is offering them to other firms at a very low price.

Ford has 15 coal mines and he has no trouble with his miners. He provides good houses at a rent of 8/- per room per month. He charges them £6/15/- a year for the coal they use; and he pays them more than they expect.

He has about 620,000 acres of timber land, and he operates his own sawmills. Formerly, one-half of every tree was wasted, but now it is all used, even the branches. He has an immense wood distillation factory. He dries his lumber in 52 kilns, 222 by 20 by 22 feet in size. Green wood contains 40 per cent. water, and this is dried down to 7 per cent. He uses maple, birch, elm and oak.

There are 110,000 employees at the Detroit Works alone.

Ideas for Small Capitalists.

Be a Magician.

Prof. K. S. V. Nath, Magician, Camp. Sivaganga, sends us the following:—

To start this business no great capital is at all required. So anybody with a capital of Rs. 50 can earn a decent living honourably, quickly and without much strain through this means. Again this business is not an uncertain one. Let me explain myself a little further.

Let anybody desiring to follow my instructions have Rs. 50 on hand. This amount will amply do to equip himself with all the necessary requisites for his undertaking. The practice of the art is not tedious or uninteresting. So the gentleman can master it within a very short time. The articles he requires for his entertainments may be easily carried in a brief bag or a small steel trunk. With those articles he may do astounding and admirable pocket tricks so as to attract a good audience and keep them engaged for full two hours. He may secure a good income in garden party entertainments and on festival days and marriage occasions and such other similar functions. Even if he confines himself in giving performance only in schools he is sure to get something at least. If I may be asked to give a detailed account of the income, I can say that if he gives at the rate of twenty performances per month, he can get at least Rs. 300 per month, the income for each performance being Rs. 15 on an average. Deducting Rs. 100 for travell-

ing expenses and other contingencies he may easily get Rs. 200 as his net income. Since he need not have any assistant according to my method the whole amount goes to his own pocket.

Thus a promising career is assured and acquaintance with all prominent people is easily gained, which will serve as a good deal in the successful leading of life. This method is quite practical and I have given it purely out of my own experience. Moreover, I am pleased to say that I have trained many a young man in this way and they are all free from care of livelihood.

For any aspiring gentleman seeking the full particulars of my method, I am prepared to furnish it free of charge.

Occupations for Purdanashin Ladies.

154. Mr. Har Narain Sethi, B. Sc., sends us the following.

The industry which I am going to mention is, as the readers will themselves realize, one of the simplest and easiest piece of business and one which "will bring good money with the least possible capital. Basket making is a very ancient profession. I will confine myself only to those baskets which are manufactured from the leaves of reed bushes and date palm trees. The materials required are leaves of date palm tree and leaves of reed bush (sar). The only apparatus is a couple of *Suas* (*Sua* from *Suee* a needle). *Sua* is a bigger iron needle having a hole at one end and pointing at the other. Its length varies from $2\frac{1}{2}$ inches to $4\frac{1}{2}$ inches. A *Sua* can be had from a shop which deals in

iron things or from any general merchant. This *Sua* is also used for sewing jute bags and jute cloths.

Reed leaves are collected in the left hand thumb and first two fingers about the thickness of a woman's smallest finger, an 'overlapping round' of the leaf of a date palm tree is given, by the right hand, on the 'collected bundle' of reed leaves. The pointed end of *Sua* is pierced in the reeds bundle and the pointed end of the date palm leaf is sent through the hole of the *Sua*. The latter is taken out from the other side and another 'overlapping round' of the date leaf given to the reeds bundle just to the right and so on till the date leaf is almost finished and another begun. When the base reaches a certain diameter the direction of work is changed. This is the beginning of the wall of the basket. The wall generally makes an obtuse angle with the base, but it may make an acute or right angle with the base depending upon the desire of the worker and the buyer.

The shape, size, make and finish all depend upon the demand in the market. After a time the hand works so smoothly and gives such a fine finish to the basket that one would be pleased to see it. Small baskets with lids, etc., can be (and are) made. Sometimes, to increase the beauty of the articles a few coloured leaves or leaf pieces are introduced at regular intervals without increasing the cost of the finished products appreciably.

A few words on the raw materials will be worth mentioning. It is the usual practice in northern Punjab to

burn the reed bushes when the latter become dry. Sometimes the farmers and owners of crops and fields, (which crops are surrounded by these reed bushes) allow to cut the green leaves *gratis* in case some body takes it upon himself to remove them. The dry leaves may also be used either dry or after soaking them in water for a few minutes. It is more convenient to handle the green reed leaves. As for the date palm leaves fresh leaves may be used as long as they are available. The dry ones can be made wet before use. Where there are no date palm trees the bundles of leaves may be imported from neighbouring date palm growing districts. The cost of these leaves is very nominal. Where no other and cheaper arrangements exist the grasshoppers will be very willing to provide the green reed leaves (and also palm leaves if the trees are locally grown) daily or after every second or third day at a very low price. It is the general experience of those people who belong to northern Punjab and those who have used baskets made in this way that these articles are durable and well finished. The demand is almost always much larger than that of supply; this ensures a ready and paying business for a long time to come. It may be interesting to note in this connection that some of the professionals have ceased making basket and have confined themselves more to other works of date leaves.

2. Coarse leaves of reeds and date trees may be successfully and profitably used for cheap fans, brooms, and mattings (of various forms) either as a separate work or in conjunction with

the above using residual and uneven leaves from basket making. Here it may also be mentioned that small pieces of seats (either round or square and about 1½ feet in width) can be made out of these leaves. Leaves of other trees (e.g., Bunyan) may be stitched together to make leave-sheets for taking food. They are indispensable in many Indian festive occasions.

3. It is a pity that some women are said to be starving for want of an honest work. This rarely happens in the Punjab. There are few 'helpless widows' in this province in the sense that they are not able to earn for their necessities with regard to food and clothing. A great majority of the women of the Punjab—be they old or young, rich or poor, widows or Purdanas—*nashins*—are given to hand spinning. The Punjab is the home for *Charkha*. So much of the yarn is spun by women of Northern Punjab that the weavers with their groups of families of places like Bhera, Khushab, Pind Dadankhan and Mooltan are kept busy for years and years. The result is that there is a regular trade going on in northern Punjab. The brokers, weavers and their wives regularly go to the tollas, mohallas and streets and buy hand spun yarn from the women. Sometimes the women give their own yarn for preparing 'bed clothes, etc. They pay for the labour of weaver and either keep the clothes, chaddars at home or sell it at a profit. I hope the time is not far (at least it should not be far) when this sort of work will be taken by women of other places and provinces; and thus make their lives not only independent but also decent.

SMALL TRADES & RECIPES.

Cattle Embrocation.

(1) Camphor, 540 grains; Acetic Acid, 15 fl. oz; Methylated spirit, 18 fl. oz; oil of turpentine, 51 fl. oz; six eggs; distilled water, 45 fl. oz. (2) Olive oil, 4 fl. oz; Oil of turpentine, $\frac{1}{2}$ fl. oz; solution of ammonia, 1 fl. oz; (3) Olive oil (or other suitable oil), 30 fl. oz; oil of turpentine, 20 fl. oz; solution of ammonia, 20 fl. oz; distilled water to 80 fl. oz.

Silver Plating Copper.

Silver nitrate, 2 oz; distilled water, 4 pints. Dissolve and add 20 per cent. solution of potassium iodide as long as a precipitate is formed. Collect the precipitate, free from nitrates, then dissolve it in hot strong solution of 90 per cent. potassium cyanide, using only just enough to effect solution. Dilute to one gallon; warm the solution to about 180° F and immerse the articles in it for about two minutes, after they have been carefully cleaned and especially freed from grease. Remove from the bath, rinse in clean water, and polish.

Care of Furniture.

Furniture responds to constant care and attention as surely as a child, and just as surely neglected furniture deteriorates in appearance and value. Many people complain that their homes are attacked by woodworm, and in 75 per cent. of cases this is due to neglect, for the post rarely appears in furniture that is constantly polished.

But the mere application of polish is not enough, it is the vigorous rubbing that counts, and years of it. No labour-

saving device can be suggested to take its place, and whether the housewife relies on the simple and old-fashioned beeswax and turpentine, or whether she pins her faith to a modern cream, the conditions are same.

Sage and Sulphur Hair Restorer.

This is an old-fashioned remedy which has been in favour for many years, and for which there is a large, popular demand. It was formerly prepared in a very crude manner by adding precipitated sulphur to an infusion of sage leaves but in modern practice milk of sulphur, which is more finely divided than the ordinary form, is used and several other ingredients are added, including acetate of lead, which combine with the sulphur to darken the hair as already noted. The acetate of lead may be omitted, if desired. The complete formula is as follows:—

Sage leaves	1 oz.
Henna leaves	$\frac{1}{2}$ oz.
Milk of Sulphur	3 oz.
Acetate of lead	$1\frac{1}{2}$ oz.
Tincture of Cantharides	2 oz.
Glycerin	1 pint.
Boiling water	1 gallon.

Pour the boiling water over the sage and henna leaves and let stand until cool, then strain. Rub the sulphur and the acetate of lead together and add the glycerin and cantharides slowly to make a paste. Then stir into the sage and henna liquid. Colour and perfume, if desired. As sulphur is insoluble this will make a cloudy mixture which must be labelled: To be shaken before using.

INDIA'S INDUSTRIAL PROGRESS.

Industries of Ceylon.

The Industries Commission appointed to enquire into and report upon measures for the encouragement of the industries (other than agriculture) of Ceylon, recommended *inter alia* the establishment of a Central Bureau of Industry and Commerce. While emphasising the importance of scientific research in the development of industry, the Commission also urge that the scientific aid placed at the disposal of the various industries should be organised. The aims of a Bureau of Industry and Commerce such as the Commission recommend would be:—

(1) The establishment of a Central Museum of Ceylon economic products; (2) to collect and collate statistics and impart information, and where necessary, to organise propaganda for the extension of the foreign market; (3) to collect information regarding the conditions and requirement of foreign markets in so far as they affect the disposal of Ceylon products; (4) to assist all the industries in regard to points requiring scientific advice; (5) to foster new industries and to assist and advise them, in their initial stages; (6) to keep in close touch with similar institutions in other countries; (7) as far as possible to co-ordinate and direct the scientific investigations of economic problems, and to

keep in close touch with all scientific work being carried out in the Colony, with a view to preventing overlapping of work; (8) in general to keep in touch with modern requirements and advances, and endeavour to keep the local industries well organised both in production, equipment, and economy of working.

Dairy Industry in India.

Stating that the dairy industry in India at the present moment is, probably in a more backward and undeveloped state than in any other civilized country in the world, the Imperial Dairy Expert, contributed a lengthy article to a local contemporary. In conclusion he asserts that from an agricultural point of view the development of the dairy industry in India is of the greatest importance, because:—(1) Only by this means can the greatest of all agricultural problem in India, the cattle-breeding problem, be placed on a sound economic basis. (2) It particularly lends itself to development on co-operative lines; agricultural co-operation has been the business salvation of the small holder in many countries and it should be so in India. (3) The solving of the cattle-breeding problem on dairying lines must at the same time enormously increase the productivity of the land, as the farmer will breed, rear and feed his own

animals on his own land and their manure will be available to renew the fertility of the soil year by year.

From a general point of view as apart from the purely agricultural aspect of the question, there remains the great and far reaching effect of the development of this industry on the health of the common people. Cheap and pure dairy produce is essential to the health of the community; they cannot get it now, and nothing but the development of dairying as a national industry will give it to them.

Textile Industry in Mysore.

The Development of Industries, Mysore has made a careful examination of textile industry in the State, and practical measures have been devised for its improvement. Special attention has been given to weaving, which, next to agriculture is the most important industry in the State. A careful study was made of prevailing conditions, and experiments were conducted to determine the direction in which the industry was capable of improvement in every stage, and the necessary action is being taken to effect further improvement in all its aspects. The three chief problems taken up for investigation were:—(i) To introduce improved appliances for weaving silk that could be utilised by cottage workers and suitable machines for reeling, twisting and throwing silk, so that silk weavers may be able to use mature reeled silk; (ii) to introduce a small plant for preparing woollen yarn for supply of cottage weavers, and (iii)

the supply of sized warps and yarns to cottage weavers.

Cotton Research Institution in C. P.

A new Research Institute for the improvement of crops at which special attention will be paid to cotton and to the fundamental problems underlying the production of this crop in India has recently been inaugurated at Indore, in Central India. The foundation of this new Institute has been made possible by the provision of a valuable site of 300 acres by the Indore Durbar, by a grant of Rs. 2 lakhs for capital expenditure by the Indian Central Cotton Committee, and by a new large annual contribution for current expenses in addition to the income derived from the land at the disposal of the Institute. This annual grant has been provided jointly by the Indian Central Cotton Committee and by seven of the Central India States.

Progress in Bengal.

According to the annual report of the Department of Industries, Bengal satisfactory progress was made in different fields. Successful experiments have been conducted in several shellac factories for devising means for refining shellac. Experiments have been successfully carried out in a local glass work to show that in the manufacture of good glass, sodium carbonate or soda ash imported from Europe can be partly or wholly replaced by the cheaper salt cake obtainable as a by-product in the acid industry without the use of high temperature which was hitherto believed to have been necessary.

SCIENTIFIC AND INDUSTRIAL TOPICS.

New Silk Invention.

A machine so delicate that it detects the slightest unevenness in silk thread down to 2-1000 of an inch and counts and classified under eleven heads any unevenness and other defects in the thread, is now in use. It performs work so minute that it escapes the human hand completely and is visible to the eye only under powerful microscopes. The machine is introducing an unprecedented precision into the testing of silk shipments from Japan.

Essentially it is a machine for winding silk from bobbins into skins by passing the thread through a groove in a gauge. The groove is adjusted until a feeler, .002 of an inch thick, fits close enough to just support a specified weight. As ten threads pass through ten separate grooves the least variation in any thread is detected and immediately the machine stops.

Romance of Glass.

It has been remarked that long ago, before glass was manufactured, natural glass in the form of pitchstone and as obsidian was recognised as of value for cutting purposes, and arrow heads, axes, implements of warfare and of the chase were fashioned from naturally occurring glasses. But, fashionately, glass had contributed to a singular extent as one of man's blessings, and its uses in war-

fare had been of a minor character. In Egypt it occurred as decorations on early seals and on vessels decorated in colour with chevron patterns. The Phoenicians converted glass into many forms of heads to form a medium of barter and trade, whilst the later Egyptians, and especially the Romans, added to the beautiful in life by their skilful use of glass wrought into vases, mosaics, glass figures, and cameos. It was the expression of an advanced stage of civilisation rather than a medium or instrument for further progress. In its more useful forms, such as glazing windows, they had but few examples in Roman times, although sheets of window glass were discovered during excavations at Pompeii. As to serving other useful purposes than drinking vessels, vases, etc., they had little knowledge, although there were possibilities that even 6,000 years ago small glass lenses were known and used, for certain cuneiform inscriptions discovered in Chaldea were so minute as to be illegible to the naked eye, although the characters were perfectly formed. The inscribing tools had also been discovered. Many hundreds of years elapsed after the decay of Rome before glass began to be employed in general usefulness, as in the lamps for mosques in Syria, decorated with enamel, and they reached the 12th and 13th centuries before the virtues of glass for

glazing church windows and for a variety of other purposes began to beat all widely recognised.

Artificial Wax.

* The product which is popularly known as wax, is produced by bees which treat the pollen and nectar of plants in the laboratory of their bodies and convert these substances into honey and wax. The wax is exuded by the bee in the form of thin plates between the rings of the back of the body, its formation in the body of the bee being a process which it has not yet been found possible to imitate, although the chemical nature of bees-wax is to-day perfectly well-known. Quite recently a Hungarian chemist has succeeded in producing an artificial wax. On his process, oxygen or a gas which contains oxygen in a free state, is allowed to pass through paraffin or similar solid carbohydrate substance after it has been melted at a temperature of 150 deg. whereby the formation of wax may be accelerated by increased pressure of 5 to 10 atmospheres or by so-called catalytic mediums, such as metals, which will attract the oxygen. After treatment for a period of about 8 hours, an oxidation product of paraffin will result which will easily be recognized as wax, even by smell.

Artificial Larynx.

To all mutes whose dumbness is due to a defective larynx—said to be a large portion of their total number—speech is made possible through the invention by Dr. Harvey Fletcher of a mechanical

device which stimulates the human voice. Credit for the idea of the device is given to Dr. J. E. Mackenty, who first demonstrated its practicability a short time ago before medical society. Three patients were introduced, and all three, according to persons who were present, although they have been absolutely inarticulate before were able to talk so that their words were audible and clear in a room of considerable size.

While the application of the device is limited to the stimulation of a low-speaking voice, the invention promises actually to save the lives of persons whose larynxes may be removed by surgery. An operation for cancer of the throat, with the removal of the larynx, for instances, leaves the patient unable to breathe through the nose, and it is often necessary to cut a hole in the neck which, while enabling the patient to breathe, makes speech impossible.

Over this hole is placed a pad, and from this a rubber tube leads to a device which agitates the vocal cords. Air forced from the lungs is set into vibration here, and these vibrations are carried through a short tube to the mouth, the vibrations producing speech which can easily be understood. It differs from natural speech chiefly in being a monotone.

Vulcanised Fibre.

This material has been in use for sixty years or so, and its uses are constantly being extended, since it combines great strength, durability, and toughness with resiliency and non-conducting

properties. The majority of the people who apply it are probably unaware of its production. The raw material from which it is manufactured is cotton rags, carefully sorted, cleaned, cut up, and boiled. Then follows treatment in beaters, which reduce the rags to a fibrous pulp. The pulp is passed through a paper-making machine, from which it emerges as sheets of various thickness. The sheets are treated with zinc chloride, and then run through an acid bath, which gives them great toughness.

The next process is that of soaking the sheets for months to eliminate the acid. The de-acided sheets are dried, pressed flat in hydraulic presses and surfaced by calender rolls. The material is then put into stock for seasoning. Rods of fibre are made by cutting the sheets into strips, which are drawn through rounding machinery. Tubes are formed during manufacture round mandrels of the required diameter and afterwards rolled. Fibre can be made to stand a tensile stress of 15 000 lb. per sq. inch. Its weight is only about one-third greater than that of water. Any one who possesses a valise or trunk made of high-class fibre can testify to its strength. The standard test imposed at a certain trunk-maker's was to run several yards, spring into the air, and come down with the heels on the centre of the article being tested!

Vegetable Surgery.

As surgery, or operatory medicine, is employed in eradicating certain diseases from the human body so vege-

table surgery may be invoked for the destruction of parasites in plants. Vegetable surgery has many analogies with animal surgery. An organ deeply attacked or capable of being regarded as a seat of infection should be removed in either case. That is so much the more easy in the case of a plant, as the latter is a being whose growth, by budding is indefinite, and that the organs removed are replaced by equivalent organs in a comparatively short time. Researches have shown how vitality may be restored to a sickly tree. The best known process called "phloiooplasty," consists in removing in a partial or general way the old bark from the trunk and large branches of a diseased tree as far as the liber. The dressing of the wounds, which ought to be kept as clean as those of man, is done thus: If the disease be so deep seated as to necessitate exposing the wood, a protective coating after cleanings, is spread on the surface of the wood, which preserves the wound from contact with the air, but if there be a living piece of bark whether in the heart of the wood or on its edges, it must be respected and protected by some folds of the suberose layer. Such surgical interventions may be useful when chemical treatment has no effect.

Chinese Paper Umbrellas.

Details concerning the manufacture of paper umbrellas in Foochow, China which is an important centre for this class of product are now available. The frame work and handle of the umbrella are made of bamboo and the shade of

tissue paper, painted with tung oil. All these materials are products of Tukien province. Factories now number two hundred and thirty. A big factory may produce from ten thousand to fifty thousand umbrellas a year, while a medium-sized factory produces under ten thousand. The frame work is supplied by private households, while the handles are supplied by bamboo shops and the lacquer wooden handles by lacquer shops. When the frame work is sewn with cotton yarn or human hair tissue paper is put on top, on layer over the other, and tung oil at the same time applied evenly. The tissue paper is not strong in itself, but once tung oil is applied it becomes sun and waterproof. When the shade is completed the whole is coloured and painted. The brass work is the work of another craftsman. When the umbrella is completed it is opened and placed in a dry place to hasten evaporation, which takes about a month before it is ready for packing. The price for a common umbrella ranges from 30 to 50 cents; and improved lady's parasol from 60 cents to a dollar.

Vegetable Gems.

One of the last places in the world in which one would expect to find precious stones would be in the stems of plants, writes the SCIENTIFIC AMERICAN. Yet, now and again, substances which closely resemble opals and pearls are discovered in certain plants. The giant tropical bamboos grow in large clumps to the height of one hundred feet. In

the young stages of growth the hollow stungs of the bamboos are filled with a jelly-like substance. As time goes on this dries up and an interesting mineral deposit known as "tobasheer" is formed. Some of this plays a part in making the bamboo stem stiff and strong but, now and again, there is an excess of the mineral which settles in more or less rounded lumps at the joints of the stem. These are pale blue or white in colour and, on being heated, become brightly phosphorescent. There is a close chemical connection between the bumps of "tabasheer" in the bamboo and an opal and the general colour and the manure of light reflection are much the same.

Stones are now and again, met with when sawing up trunks of teak, rosewood, and certain other trees. These masses are embedded towards the centre of the stem and it has sometimes been thought that they got into their position when the tree was young and as time went on, have become enclosed by the growing wood. Of course such things do happen in the life of trees for not only stones but pieces of iron and other metal have been found. The stones under consideration however, are produced by the tree itself and are closely similar in their formation to pearls. These vegetable pearls are almost entirely carbonate of lime.

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FORMULAS, PROCESSES & ANSWERS.

Khaki Colour.

162. K. Srinivasalu Naidu—Wants to produce *khaki* colour on cotton goods.

In order to obtain *khaki* colour proceed as follows:—Work a test skein of cotton in a cold bath consisting of a 5 per cent. solution of ferric chloride with a 5 per cent. solution of chrome alum then pass into a bath containing 10 per cent. of soda ash; enter cold and gradually bring to the boil. Wash well, and soap as usual. By varying the relative amounts of iron and chromium salts, or by the addition of a small amount of manganese salt, the shade of this *khaki* may be varied in order to obtain any tone desired.

Solders for Metals.

3441. Durga Dayal—Wants to know the composition of solders for different metals.

The following table will show everything.

Lead Solder: Tin 1 part; lead 3. Flux, colophony.

Tin solder: Tin 1.5 part; lead 1. Flux, colophony.

Solder for brass, copper, iron: Copper 2 parts, zinc 1. Flux, borax.

Silver solder: Silver 1 part; brass 1. Flux, borax.

Gold solder: Gold 12 parts; silver 2; copper 4. Flux, borax.

Bismuth solder: Lead 4 parts; tin 4; bismuth 1. Flux, colophony.

Removing Ink Stains.

204. P. Suryanarayana Naidu—Asks how to remove ink stains.

Instead of using oxalic acid, which attacks the fibre of the texture, prepare a mixture of 2 parts of tartar and 1 of powdered alum. This does not injure the clothes; it may also be used for removing other stains.

Brass Solders.

The same gentleman wants brass solders.

Brass solder consists of brass fusible at a low temperature, and is made by melting together copper and zinc, the latter being in excess. A small quantity of tin is often added to render the solder more fusible. Hard solders are usually sold in the form of granule. Although many workers in metals make their own solder, it is advisable to use hard solder made in factories, as complete uniformity of quality is more easily secured where large quantities are manufactured.

In making hard solder the melted metal is poured through birch twigs in order to granulate it.

Preserving Books from Insects.

494. Harish Chandra Saxena—Writes, 'How to preserve books from insects.'

The following varieties have been found to prevent effectually the ravages of cockroaches and of all insects that feed upon books.

(A) Dammar resin	4 oz.	that has been recommended.	Place 2
Mastic	4 oz.	dr. of crystallised carbonate of soda and	
Canada balsam	2 oz.	1 oz. of extract of logwood in a porcelain	
Creosote	1 oz.	receiver with 8 oz. of distilled water.	
Spirit of wine	20 fl. oz.	Heat this until the solution reaches a	

Macerate with occasional shaking for a few days if wanted at once, but for a longer time when possible, as a better varnish will result after a maceration of several months.

(B) Corrosive sublimate	1 oz.
Carbolic acid	1 oz.
Methylated spirit	1 qt.

Where it is necessary to keep books or paper of any description in closed book cases some naphthalene balls should be always present with them.

Copying Inks.

472. N. Gopalswamy.—Requires formulas of copying ink.

Copying inks may be made by adding a small quantity of alum to an extract of logwood. To this is added table salt or sugar and glycerine. The inks so obtained are purple when first used, and darken gradually on the paper. The copies taken from them darken still more slowly. Violet writing ink may be converted into copying ink by the addition of glycerine in the proportion of about 3 parts of the latter to 4 parts of the violet ink. If a quantity of glycerine less than the foregoing be used, the ink will copy within a quarter of an hour after writing. An ink which will yield one or two copies by hand pressure may be made by mixing, say, 1 pt. of glycerine in 3 pt. of jet-black writing ink. The following is a recipe

Strike-any-where Matches.

401. Puri Match Industries Ltd.—Want formula of strike-any-where matches.

The tipping composition for "strike-anywhere matches" consists of red phosphorus with other ingredients as follow. (1) Phosphorus 1 part, chlorate of potash 8 parts, glue 4 parts, whiting 2 parts, powdered glass 8 parts, water 22 parts. (2) Phosphorus 2 parts, chlorate of potash 5 parts, glue 3 parts, red lead $1\frac{1}{2}$ parts, water 12 parts.

Lamp-black.

3610. N. V. Pai.—Desires to know how lamp-black is manufactured.

Lamp-black used to be originally made by burning lamps fed with refuse oils in a close chamber and collecting the soot from sacking and sheepskins hung up in the room, upon which the smoke from the lamps formed a deposit. From this process it obtains its name. Lamp-black is now prepared from bituminous substances such as impure resin and other refuse which remains after the distillation of turpentine. This is burnt in

a furnace with a small supply of air, so as to make it smoulder and not burst into flame. The dense smoke which arises on this account is passed into chambers and collected, as described above. This is carbon lamp-black in its crude state and contains bituminous and resinous matters. These may be abstracted by heating the lamp-black to redness in a close vessel, when it becomes almost pure carbon.

Cutting Glass Bottles.

3667. Govindram Chawla—Asks, 'How can I cut a glass bottle?'

Pass 5 or 6 strands of coarse packing twine round the bottle on each side of where you want it divided, so as to form a groove about $\frac{1}{4}$ in. wide; in this groove pass one turn of a piece of hard laid white line, and extend the two ends, and make them fast to some support; then have a tub of cold water close to you and, grasping the bottle by the neck with one hand and the bottom with another, saw the bottle quickly backwards and forwards for a short time, you will soon notice a burning smell caused by the friction of the hard cord. After about one minute's friction, by a side motion of the bottle, throw it out of the line into the water, and then tap against the side of the tub when the bottom will drop off.

Making Ruby Glass.

344. Rati Ram Gulzari Lal—Writes, 'How ruby glass is manufactured?'

The best or genuine ruby glass owes its colour to the presence of gold in the

substance of the glass, and is, of course, very expensive, and the production is limited. Ordinary ruby glass is not coloured throughout its substance, but is simply flashed with the colour; that is, only the surface of the glass is covered with a thin coating of the colouring matter. A ball of white glass is taken upon the blowpipe and dipped in the melted ruby glass and then blown and fashioned to the required shape. Ruby glass is prepared by adding gold chloride to the materials that are used for the production of white glass; the quantity is small as the amount of gold in the glass is only about 1 in 200. The glass is heated twice, because the colour does not properly develop at the first time of heating. A ruby glass may also be made with copper oxide by heating in a reducing atmosphere; this also requires heating a second time, but the colour is not so good as the gold ruby glass. The presence of colour in transparent glass is manifested in all its beauty and intensity by the passage of light through the glass, and the colour of opaque glass is shown by the reflection of light from the surface of the glass, so that the difference between the two is the difference between transmitted light and reflected light.

Carbon Paper.

3792. A. D. R. B. Bombay—Requires a formula of carbon paper.

The following methods of making carbon paper will be found satisfactory.

(a) Finest lamp black 5 parts, olive oil 5 part, cerasin wax 1 part, and petroleum

ether 10 parts. (b) Lamp black 5 parts, cerasin wax 6 parts, olive oil 5 parts, and petroleum ether 15 parts. The lamp black is first weighed and placed in a mortar, then the oil is added in small quantities at a time and thoroughly ground with the lamp black. The mixture is then transferred to a small dish or pan and slightly heated, and the cerasin wax added; when the latter has thoroughly melted, well stir the mixture, remove it to a safe place, and while still warm add the petroleum ether. The mixture, while warm, should be applied with a brush to paper that has been heated in an oven. After the application, lay the carbon paper on an old newspaper and return to the oven to allow the mixture to soak in. After about half an hour's heating any excess of fluid may be removed with a cotton rag; the paper will be fit for use on cooling. For a bluish-black shade, add a little Prussian blue.

Ruling Ink.

314. K. Srinivasalu Naidu--Requests us to publish recipes of ruling machine ink.

Recipes for making ruling machine ink both red and blue are given here.

To make red ruling ink, boil $\frac{1}{2}$ lb of Brazil wood shavings in 2 qt. of dilute vinegar, then dissolve in it 1 oz of gum arabic, 1 oz of sugar, and 1 oz of alum. As blue ruling ink can be made by dissolving 1 oz of sulphate of indigo in qt. of water, and adding 1 oz of gum arabic and 1 oz of sugar.

Preserving Butter.

354. Konar Dairy--Enquire, how to preserve butter.

To preserve fresh butter, well press it and incorporate with it some salt; work out most of the water by kneading, then press into clean jars, fasten parchment paper over them, and keep in a cold cellar. Butter thus prepared will keep for several months. Fresh butter, if properly prepared and free from excess of water will usually keep for a long time. Preservatives are sometimes added, but they are more or less harmful, borax is perhaps the least objectionable, and is added in quantities of 2 grains per lb.

Polishes for Aluminium.

367. Andhra Trading Co.--Want recipes for aluminium polish.

Aluminium is susceptible of taking a beautiful polish, but it is not white like that of silver or nickel, rather slightly bluish, like tin. The shade can be improved. First, the grease is to be removed from the object with pumice stone. Then, for polishing, use is made of an emery paste mingled with tallow, forming cakes which are rubbed on the polishing brushes. Finally rouge powder is employed with oil of turpentine.

Vinegar Making from Fruit.

241. S. S. Phatarpekar.--Desires to know how fruit vinegars are prepared.

Take the stalks from the fruits which should be quite ripe and highly flavoured: weigh and put it into large

glass jars and to each pound pour about a pint and a half of fine pale white wine vinegar. Tie a thick paper over them, and let the fruits remain from 3 to 4 days: then pour off the vinegar and empty them into a jelly-bag; take an equal weight of fresh fruit, pour the vinegar upon it, and 3 days afterwards repeat the same process, diminishing a little proportion of the fruits of which the flavour ought ultimately to overpower the vinegar. In three days drain off the liquid very closely, and after having strained it through a linen or a flannel bag, weigh it, and mix with it an equal quantity of highly refined sugar roughly powdered; when this is nearly dissolved, stir the syrup over a very clear fire until it has boiled 5 minutes, and skim it thoroughly; pour it into a delicately clean stone pitcher, throw a folded cloth over and let it remain until the morrow; put it into pint bottles, and cork them lightly with new velvet corks otherwise they will burst. In four or five days they may be closely corked, and stored in a dry and cool place.

Varnish for Printing Inks.

3492. P. K. R, Ramnad—Wants to prepare Printing Inks.

Place one and a half gallons of linseed oil in an iron pot and fire under it. After a time the oil simmers and bubbles up, but as the temperature increases the surface resumes placidity; next it commences to smoke, and then to boil, emitting a very strong odour. As the boiling continues a scum arises.

At this stage repeated tests should be made to see if the vapours will ignite. When they will do so, the pot is removed from the fire and placed on the ground. In the meantime the contents are very frequently stirred and kept burning. Samples are occasionally withdrawn to test the consistency of the varnish, for which purpose the flames must be extinguished by covering the pot. When drops of the varnish, after cooling, will draw out into strings about half an inch long it is suitable for an average letter press printing ink, and the flames are finally extinguished. This completes the varnish, but it is customary to add other ingredient, which may or may not enhance its value for printing purposes. On removing the lid of the pot there is much frothing and a great escape of pungent smoke. The froth will subside after a thorough stirring, upon which six pounds of rosin are gradually introduced and stirred in. When the rosin is dissolved, one and a half pounds of brown soap is cut into slices and stirred in piece by piece. When all the soap is in and the frothing once more ceases the pot is returned to the fire until its contents begin to boil, constant stirring being maintained. This completes the operation.



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Gripe Water.

371. Brij Lal Kishori Lall.—Desires to be informed on gripe water.

Gripe waters are generally very mild alkaline mixtures with carminatives, intended for the minor stomach disorders of children. Two receipts are given.

- I. Sodium Bicarbonate gr.
Ammonium carbonate gr.
Compound Tincture of cardamoms 5 min.
Compound syrup of Rhubarb 10 min.
Distilled Water to 1 fl. dr.
- II. Light carbonate of Magnesia 2 gr.
Sodium Bicarbonate 1 gr.
Spirit of chloroform 1 min.
Glycerin 5 min.
Peppermint water to 1 fl. dr.

Dyeing Yarns Red.

438. B. V. Naidu.—Requests us to publish recipes of dyeing yarns red.

RED.

Dye with $4\frac{1}{2}$ lb. Primuline, $\frac{1}{2}$ lb. Diamine fast yellow A and 20 lb. salt, then diazotise and develop with beta naphthol.

BRILLIANT RED.

Make the dye-bath with $2\frac{1}{2}$ lb. Brilliant purpurine R and 25 lb. Glauber's salt, working at the boil for one hour.

BRIGHT RED.

Dye with 3 lb. Benzo purpurine 4B, 3 lb. soda and 15 lb. Glauber's salt. This dye may also be used with 3 lb. Soap and 10 lb. soda in the bath with equally good results.

DARK RED.

Use in the dye bath 3 lb. Diamine red 5B, 2 lb. soda and 20 lb. Glauber's salt, working at the boil for one hour.

The above recipes are for 100 lb. of yarns.

India Ink.

508. K. K. Gopalan. Wants to know how India ink is prepared.

Purify fine lamp-black by working it with a solution of caustic soda, dry, and make into thick paste with a weak solution of gelatine containing a few drops of musk essence and about half as much ambergris; mould, and dry. Instead of gelatine the following solution may be used. Seed lac, 1 oz.; borax $\frac{1}{4}$ oz.; water, 1 pt.; boil, until a solution is effected, and make up with water to $\frac{3}{4}$ pt.

Sugar of Lead.

533. Sita Ram Chopra. Wishes to learn the process of making sugar of lead.

Lead acetate is known as sugar of lead. It is prepared as follows. Acetic acid (sp. gr. 1.0843), 23 parts, is gently heated in a copper boiler rendered electro-negative by means of a large flat piece of lead soldered within it, and litharge (pure, and in fine powder), 13 parts, is sprinkled in; the heat is then continued with constant stirring, until the acid is saturated, when the mother waters of a former process, if any, are added, and the whole is heated to the boiling-point, and allowed to settle until cold; the clear portion is now decanted, and evaporated in a similar vessel until the liquor has the sp. gr. 1.266 or 1.267, when it is run into salt-glazed stoneware vessels (the edges of which have been well smeared with candle-grease) and allowed to crystallise. The product is 38 to $38\frac{1}{2}$ parts of crystallised sugar of lead. It is found to be advantageous to preserve a very slight excess of acid during the boiling and crystallisation, to prevent the formation of any basic acetate the presence of which impedes the formation of regular crystals.

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BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

368. J. L. Dass—The following is a list of technical and engineering colleges required by you: 1. Bengal Engineering College, Shibpur, Howrah; 2. Bengal Technical Institute, Jadabpur, 24 Parganas; 3. Serampore Government Weaving Institute, Serampore, Howrah; 4. Bihar Engineering College, Patna and 5. Thomason Engineering College, Roorkee, U. P. For an exhaustive list consult Directory of Technical Institutes in India.

370 V. S. Saksena—Papers are manufactured by Basted Paper Mills Co. Ltd., 189, Upper Thames Street, London E. C. 4; Sun Paper Mills Co. Ltd., Fenis Cowles Blackburn, England; A/S Union Paper Co. Ltd., Toldbodg, 12, Christiania, Norway; A/S Drammen Paper Mills, Drammen, Norway; C. Schmitz & Co., Maybachtrasse 170, Cologne, Germany and Seitara Arai, 11, Itchome, Onoecho, Yokohama, Japan. Fountain pens are made by J. E. Waterman & Co., Pencorner 41, Kingsway, London W.C. 2. Diamond Point Pen Co., 44 E. 23rd Street, New York City, U. S. A. and Karl Kracker, 9, Antonstrasse, Hamburg 25, Germany. Slates are exported by Deutsche Holzwerke A-G, Magdeburg C 50, Germany. Cutlery articles are manufactured by Otto E. Stiehl G.m. b.H. Ohligs, Solingen and J. H. Becker Inc., Solingen 19; both of Germany.

372. Lonappai Antony—For Patent medicines enquire of Smith Stanistreet & Co., Dalhousie Square, Calcutta; B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta; Smith Stocking & Co., Esplanade Road, Madras and Lawrence Bright & Co., Bellasis Road, Bombay.

374. K. S. Chandrasekharan—Wants a watch case telephone receiver and transmitter.

375. K. V. Shenai—Thank you for your information.

376 Ratan Lal Bhatia—An article on tin toy manufacture will appear in an early issue.

377. S. H. Karai—Please refer your query to Agricultural Dept. of your province.

379. Abdulgani Valimohamed—For agar attar enquire of Sickri & Co., 55/8, Canning Street, Calcutta.

380. Kishun Lal Girdhary Lall—For Derby tickets enquire of J. D. Rai, Pudung Block, Kalimpong, N. Bengal.

381. Gubraj Bachraj—For tape of required design try E. B. Bros., & Co., 11, Dharamtala Street, Calcutta.

382. K. M. Parekh—An article on match manufacture will appear in an early issue. For the present you may refer your enquiry to Mr. A. P. Ghosh, 42, Beniapukur Road, Entally, Calcutta.

385. Digambari Bhandar—Write to the party attaching addressed envelope for reply.

386. Rama Ranjan Bhattacharyya—A damp-proof glue is obtained by dissolving casein in lime.

387. M. A. Husain—For petrol enquire of Asiatic Petroleum Co., Ltd., 9-4, Clive Street, Calcutta and Indo Burma Petroleum Co., Ltd., Carlton House, Murzaban Road, Bombay.

388. V. Devanayalam—Please explain the term more clearly.

389. S. S. Karkhanis—For fancy goods and linen fabrics write to Surana Dalal & Co., Alice Buildings, Hornby Road, Bombay; Chunilal Sewchand Roy, 152, Cross Street, Calcutta; Md. Sadulla Badsha Sahib & Co., 23, Godown Street, Madras and Chavanma Serawa, 178, Harrison Road, Calcutta. For perfumery enquire of D. G. Gore, Sayana Building,

Lohar Chawl, Bombay; Siekri & Co., 55|8, Canning Street, Enamul Haq, 55|12, Canning Street and Gangasagar Amarnath, 85, Colootola Street; last three of Calcutta.

390 Rakhal Chandra Mukherjee—Boil the ghee with a few betel leaves or lemon leaves.

391. M. A. Rahim.—An article on boot polish manufacture appeared in June 1923 issue.

392 R. R. Bagchi—Do you mean butter? For making butter directly from milk use cream separator which may be supplied by Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street and P. Lodge and Co., Post Box 6772; both of Calcutta. For rope making machines try Oriental Machinery Supply Agency Ltd.

393 A. Latheya—Gunny bags may be purchased of Bird and Co., Chartered Bank Buildings, 4, Clive Street and M. M. Bhagat and Co., 18, Canning Street; both of Calcutta.

394. Nand Kishore Nigam.—Stipends and scholarships are granted by the Association for Scientific Studies for Indian Students, 10, Old Post Office Street, Calcutta.

395. J. V. N. Row.—Sewing thread may be supplied by E. B. Bros., and Co., 11, Dharamtola Street and Gokuldas Damodar Das, 87, Cross Street; both of Calcutta. Put some animal charcoal in the oil to be purified. Place the oil pot in the sun for fifteen days, then decant and strain through a linen cloth. The oil thus obtained will be completely purified. Wants to buy ivory, horn and nuts for button making.

389. Premchand Ramchand.—For directory of Burma try Business Directory Co., Madras.

400. Jethanand K. B. Chugh.—Now we think Germany will be the suitable place for prosecuting your studies in mechanical and electrical engineering. For further information communicate with Indian News Service and Information Bureau, 27, Burgstrasse, Berlin C2, Germany.

402. Iqbal Bahadur Jantari.—Drawing brushes may be supplied by the Indian School Supply Depot, 309, Bowbazar Street, Calcutta. Colour pots will also be had of the above firm. Oil soluble colour may be bought of Hansraj Vishram, 13, David Joseph Lane and Mohamed Alibhoy and Co., 44, Armenian Street; both of Calcutta. Bronze powder may be purchased of Haridas Rackshit and Co., 45, Clive Street and Roy and Friends, 97, Clive Street; both of Calcutta.

403. Sant Ram Nagrath.—For books on banking enquire of Kamala Book Depot Ltd., 15, College Square, Calcutta. For securing agency go through Sale and Exchange pages of INDUSTRY.

404 S. Satyaki.—The following is a list of haberdashers of London: 1. Russell Brothers and Baker, 2, Broad Street, Place, E.C. 2; Town Henry and Co., 163, Abbot Road, Poplar E. 14; 3. Weeks and Co., Ltd., 1 and 2, Ramillies Street, Great Marlborough Street, W.1, and 4. Spencer Turner and Boldero Ltd., 61-93, Lisson Grove N. W. 1. For knitting yarn enquire of Smith John and Co., Ltd., 44, Upper East Smithfield, London E. 1, and Schulze Paul and Co., Ltd., Greenwood Street, Manchester, England.

405 Parkash Dev—For hair oil you may go through the booklet on Hair Oil Manufacture and for syrup making you may consult Syrup Manufacture; both the books published from this office. For other industrial books try Chackraverty Chatterjee and Co., Ltd., 15, College Square, Calcutta.

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ORIGINAL HOMEOPATHIC PHARMACISTS.

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Dealers in Original Homœopathic dilutions and Biochemic Triturations.

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406 Maung Toe Maung.—For lead tubes enquire of Venesta Ltd. 1, Great Tower Street, London E. C. 3 and Brooks Peel and Co., Ltd., 24, City Road, London E. C. The International Correspondence School, Box 3995, Scranton, Pennsylvania, U. S. A. may serve your purpose.

408 H. S. Khosla and Co.—For velvet enquire of Louis Alfred, 57, Newton Street, Manchester and Middleton Jones and Co., Ltd., 6, Charlton Street, Manchester; both of England. Cotton thread may be supplied by Smith John and Co., Ltd., 44, Upper East Smithfield, London E. C. 2. For almond write to Nightingale and Co., Ltd., 5, Laurence Pountney hill, London E. C. 4 and Almendra Espanola, Al, Colon, 2, Malaga, Spain. Desire to be put in touch with dealers in pepper, chilly, almond and turmeric in India.

409 Bireswar Sen Gupta.—A simple cement for glass may be made by dissolving casein in a concentrated solution of borax or by making a paste of casein and water glass.

410. Bharat Rashtriya Karyalaya.—For seeds required enquire of The Nurjehan Nursery, 1, Kankurgachi 1st Lane, Calcutta.

411. Basantlal Agarwal.—Can supply kapok cotton in very large quantity.

412. T. Motha.—Take Aleppo gall-nuts, 14 parts, Dutch maddar 1 part powder, mix, moisten and pack into the percolator. Extract with hot water, filter and press out. To the filtrate add 4 parts of iron acetate and 21 parts of tincture of indigo. Put into the water-bath and evaporate to dryness and powder the dry residue. Put the powder in tablet making machine and make tablets. Tablet making machines may be bought of Calcutta Industries Ltd., 71, Canning Street, Calcutta.

413 Maqbool Agency—Recipes of hair dye will be found in January 1925 issue.

414 Takhana Brothers.—For tin printing write to A. Lloyd and Sons Ltd.,

Pier Wharf, Deptford Green, London S. E. 8.

415. D. Jauhar.—Pill making machines may be supplied by Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street and Calcutta Industries Ltd., 71, Canning Street; both of Calcutta.

416 P. E. Nery.—If you go through September 1923 issue of INDUSTRY you will find some suggestions for starting prospective small industries. For patent write to the Controller of Patent, Patent Office, 1, Council House Street, Calcutta.

417 D. and B. Dutta and Co.—For tin boxes of required description try Gajanand Rampertap and Co., 6, Halsi Bagan Road, Calcutta. For gum camphor enquire of S. N. De, M.Sc., Post Box 7851, Calcutta.

419 Indian Leather Goods Mfg. Co.—The address you require is not known to us.

422 S. Kazim Ali.—Process of soda manufacture appeared in last issue.

423 Onkar N. Gupta.—Business Organisation and Management is published by Sir Isaac Pitman and Sons Ltd., 39-41, Parker Street, Kigsway, London W. C. 2. You may also go through Business Chances published by Mr. W. E. Copper, 523A, Bristol Road, Burnbrook, Birmingham and Business published by A. Arthur Reads Wilmslow, Manchester.

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of perfumes for above trade will be sent on receipt of the inquiries from bonafide manufacturers. Excellent qualities of the highest strength.

PRICES LOWEST.

Write for Samples to-day—

Anglo-Indian Drugs & Chemical Co.,
155, Juma Musjid Circle, P. O Box 2082, Bomba

424 Aminchand Mehra and Sons.—Enquiries from bonafide parties are inserted in the Trade Enquiry Columns of our journal only once. Moreover, your enquiries are in the nature of an advertisement hence these should not be published in these columns. However, your name has been entered in our office directory for future reference.

425 Prokash Chandra Sircar.—For magic lantern slides enquire of Newton and Co., 27 King Street, Covent Garden, London W. C. 2.

426 Laxmidass and Sons.—For directories enquire of Messrs. Thacker Spink and Co., 3, Esplanade East, Calcutta.

427 Indo-British Trading Bureau.—For inserting advertisement in widely circulated newspapers of India write to Calcutta Advertising Agency, 15, College Square, Calcutta.

428 P. B. Narayana.—For books on poultry rearing enquire of Chakraverty Chatterjee and Co., Ltd., 15, College Square, Calcutta.

429 Jairama Shai Qulrtani.—For industrial books enquire of Thacker Spink and Co., 3, Esplanade East, Calcutta. For required machineries write to Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta. At least Rs. 50,000 will be required for starting a canning and preserving factory.

431 Ananta Stores.—You may have the required drawplates prepared by local goldsmith as per order.

434 Sita Ram.—For disposing of shares of joint-stock companies mentioned by you write to Calcutta Share Brokers' Syndicate Ltd., 2 and 3, Lall Bazar Street, Calcutta.

435 J. N. Dey.—Rs. 3,000 will be sufficient for starting a match factory on a small scale. Match machines may be supplied by Bhawani Engineering and Trading Co., 122-1, Upper Circular Road and Bengal Small Industries Co., 91, Durga Charan Mitter Street; both of Calcutta. Recipes of match compound will be found in September 1923 issue.

437 Sira Veeraih Setty.—For match industry go through July 1922 and September 1923 issues of INDUSTRY.

438 B. V. Naidu.—Recipe of dyeing yarn in brilliant red colour appears in this issue.

439 K. C. Tweeddale.—Baloons of different types may be had of Ali Mohamed Akber Ali, 22-1, Lower Chitpur Road, and K. A. E. Sadka, 7, Collootola St.; both of Calcutta.

441 S. M. Nabi & Co.—Barytes may be supplied by Williamson & Co., Oldham Road, Gaya and Calcutta Mineral Supply Agency 31, Jackson Lane, Calcutta.

443 Saiyid Azim.—For glass bottles, corks, capsules, etc., enquire of P. S. Dutt & Bros., 8, Ezra Street, Calcutta. An article on snake bite cure will be found in August 1921 issue.

445 Debi Prasad Sinha.—For studying commercial and medical course by correspondence write to Educational Institute, Allahabad and Universal University, Mahuva, Kathiwar.

448 M. Uttam Shazada Mal.—You should read books on copy rights which may be supplied by R. Cambray & Co., 9, Hastings Street, Calcutta. The address of Japanese Consul-General is 7, Loudon Street, Calcutta and that of German is 2, Store Road, Ballygunge, Calcutta.

449 Moondra Commercial Agency.—To communicate with any querist write him with name and number under care of INDUSTRY when your letter will be duly redirected. Can supply papadams in large quantities.

450 Sukhadeo Prasad Tewary.—First dissolve 1 part of gum arabic in some water, then add 4 parts of sugar and

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then 1 part of starch after which boil the mixture for a while to dissolve the starch. Finally it is thinned down to the consistency of envelope gum. This will work well when applied on envelopes. Pictures, picture frames and glass sheets may be bought of Ray Babajee & Co., 182, Lower Chitpur Road; Foticall Seat & Sons, 10, Swallow Lane; both of Calcutta and Star Art Framing Works, 90, Meadows Street, Bombay. For glass cutting instruments enquire of Hem Chandra Chander, 16, Swallow Lane, Calcutta. Paints may be supplied by Kailash Chandra Dutt & Sons, 20, Bonfields Lane and Ray Friends & Co., 97, Clive Street; both of Calcutta. Nitric acid and rectified spirit may be purchased of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta and D. Waldie & Co., Konnagar, Howrah. Vernacular equivalents of gum arabic are *Khor* and *Kumta*.

451 A. S. T. Daw.—Titanium oxide, etc., may be supplied by B. K. Paul & Co., 1-3, Bonfields Lane and Bengal Chemical & Pharmaceutical Works Ltd., 15, College Square; both of Calcutta.

452 D. Lucas.—Recipes of face cream appeared in July 1924 issue.

453 Chawngnhuaia.—Wools may be supplied by Deutsche Wollges m. b. H. Markgrafenstrasse 77, Berlin; Diamant & Co., Beiden, Muhrenstrasse 79, Hamburg and Grunwald & Co., Paul, Nordstrasse 25, Leipzig; all of Germany. For lanterns enquire Sorge & Sabeck G.m.b.H, Mauerstrasse 86-88, Berlin; Kampe & Thonig Lenben, Dresden and Hackel Gebr, Bernhardstrasse 107, Chemnitz; all of Germany. Saccharin may be supplied by Hermann Ernst Mueller, Hamburg 11, Radlingsmarkt 19 and Saccharin Fabrik A-G Vorm. Fahlberg, List & Co., Alt-Salbke 57-62; both of Germany.

454 A. A. Kureshi.—Replies to your previous queries appeared in the last issue.

455 A. Louis.—Durga Charan Rackshit, Cotton Street, Calcutta deals in ghee. Magical apparatuses may be

supplied by K. Banerjee, B. Sc., 13, Radhanath Mullick Lane, Calcutta.

456 T. G. Narayana Iyer.—For books on soap manufacture write to Chakraverty Chatterjee & Co., Ltd., 15, College Sq., Calcutta.

458 Agya Singh & Sons.—For disposing of cigarette cases advertise in the pages of newspapers and periodicals. You may also try Laurel Novelty Co., 43, Park Street, Calcutta.

459 S. E. School.—A highly concentrated infusion of coffee, prepared by percolation with boiling water, gently and quickly evaporated to about one-third or one-fourth of its bulk, and mixed with a thick aqueous extract of chicory and syrup of burnt sugar, so as to give the whole the consistence of treacle. The proportions of the dry ingredients should be coffee 4 parts; chicory 2 parts; burnt sugar (Caramel) 1 part. It should be kept in well-corked bottles in a cool place. Artificial banana essence consists usually of butyric ether and amyl acetic ether equal parts, dissolved in about 5 parts alcohol. To prepare lime essence dissolve $\frac{1}{2}$ oz of oil of lime fruit in $15\frac{1}{2}$ oz of alcohol. Alcohol, 700 parts; pineapple ether, 200 parts; oil of sweet orange 100 parts. Mix well, the product will be artificial orange essence. Kola in coarse powder, 75; confection orange, 50; vanilla, 2; Ceylon cinnamon, 10; Muscatel or port wine 400, alcohol 50. Mix and macerate eight days express and filter into a solution of

Bombay Deshi Oushadhalaya.

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Ague Killer.

1 Phial as 8.

Doz. Rs. 5.

and our other popular remedies. Can be had everywhere at Cheapest Rate.

**PEARL & CO., Victoria Garden,
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sugar, 250; water 400. This will yield artificial Kola essence used in aerated water. Making thread balls from thread is a profitable industry. Sock weaving machines may be supplied by Economic Hosiery Mills Ltd., 55-2, Dharamtala Street, Calcutta. Fountain pens may be supplied by Chuo Celluloid Kaisha, 6, Itchome, Nishikicho, Kandaku, Tokyo; T. Hasegawa & Co., Tamaya-cho, Nagoya and T. Hata & Co., 5, Itchome, Yurakucho, Kojimachi-ku, Tokyo; all of Japan. Powdered borax sprinkled around the infested places will exterminate ants.

460 M. S. Malwana.—For registering trade mark write to P. Lodge & Co., Post Box 6772, Calcutta.

461 Saiyid Azim.—For ink jars enquire of Parry & Co., 11, Clive Street, Calcutta. Glass bottles of all descriptions may be bought of Satya Charan Pal, 194, Old China Bazar Street and C. K. Das & Sons, 17, College Street; both of Calcutta. Corks and capsules may be supplied by P. S. Dutt & Bros., 8, Ezra Street, Calcutta. Turpentine oil, spirit and olive oil may be purchased of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. For carnauba wax and bees-wax enquire of S. N. De, Post Box 7851, Calcutta. Soft soap may be supplied by Calcutta Chemical Co., Ltd., 35-1, Panditia Road, Ballygunge, Calcutta. For printed tin boxes enquire of Indian Colour Printing Works, 133, Beliaghata Main Road, Calcutta.

463 N. V. Kale.—There is no such arrangement for transiting money through post office.

465 Gurbakhish Singh.—For information regarding poultry farming go through Poultry Keeping in India by Isa

Tweed to be had of Thacker Spink & Co. 3, Esplanade East, Calcutta.

466 Nakul Prasad Sinha.—Wants a partner for starting a mica business in Giridih and a mining expert.

468 Bishambhar Lal & Co.,—Tin box making machines may be supplied by Alfred W. Stocker, Ingram House, 165, Fen Church Street, London E. C.

469 K. C. Pachoner.—The following is the list of foreign journals: Japan Salesman, 51 Yama Shitacho, Yokohama, Japan; International Trade Developer, 168 N. Michigan Avenue, Chicago, U. S. A. and British Dominions Trade, 15 Bedford Street, London W. C2.

470 Meher Chand.—Sponges may be supplied by B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

471 Erach D. C. Noksey.—For further information regarding sheep farming write to the writer of the article. You may also consult Dairy Farming in India by D. J. Megher and R. E. Vanghan to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta.

473 Ram Kishen Sethi & Co.,—Tin plates are manufactured by Tata & Co., Jamshedpur. Piece-goods are stocked by Bhukhandas Govindji & Co., 48, Meadows Street, Bombay and Fleming Shaw & Co., Dunally Road, Karachi.

475 Sultana Soap Co.—Filter till oil through filter paper.

477 Tarlapata Rajeswar Rao.—Recipes of lime juice glycerine appeared in August 1921 issue.

479 Bharat Rashtriya Karyalaya.—Formulas of metal polish will be found in the last issue.

481 Mohamed Rafique.—Formulas of printing ink were out in February 1923 issue.

482 Joswant Rai Ramta.—Book on Soap and Allied Industries may be bought of Chakraverty Chatterjee & Co., Ltd., 15, College Square, Calcutta. For moulds enquire of Calcutta Industries Ltd., 71, Canning Street, and C. S. Sarkar & Co., 86/1, Narkeldanga North Road; both of Calcutta.

WEAVING ACCESSORIES.

such as Cotton Healds, Wire Healds, Steel and Brass Peeds, Shuttles, Pickers, Robbins, Reed Hooks Spindles etc. supplied in wholesale and retail quantities at moderate prices For prices, write to :—

The Indo-British Trading Bureau.

15-19, Ghoga Street, Fort, Bombay

• **485 Mukhtar Ahmad Tufail Ahmed**—Please go through the Sale and Exchange pages of INDUSTRY where you will find addresses of firms wishing to open agency business.

486 Mohon Lall & Co.—Book on Manufacture of Indian Pickles Chutneys and Morabbas may be bought of Book Dept., Industry Office.

487 Abdul Azim Saheb & Sons.—Optical goods of all descriptions may be bought of Stephens & Co., Ltd., 275, Bow Bazar Street and Lawrence Mayo & Co., Ltd., 16, Old Court House Street; both of Calcutta.

488 K. R. Chaubay.—Thank you for your good suggestions

489 B. N. Gupta.—Coconut oil may be bought of Pragjee Jayaram Tanna, Post Box 32, Cochin and M. R. R. Menon & Co., Mattancherri, Cochin. Palm oil may be supplied by B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. Process of manufacturing bar soap similar to sunlight soap appeared in August, 1921 issue. 5 per cent. carbolic soap means 5 parts carbolic acid in 100 parts soap. Aniline blue may be bought of Aminchand Mehra & Sons, 34, Armenian Street, and Hansraj Vishram & Co., 13, David Joseph Lane; both of Calcutta.

490 D. V. Singh.—Swadeshi umbrellas may be supplied by Mahendra Lall Dutt & Sons, 51-53, Harrison Road and Anil Kumar Dutt, 53, Harrison Road; both of Calcutta.

491 Acme Trading Co.—The following is a list of Bengali newspapers of Calcutta. (1) Basumati, 199, Bow Bazar Street; (3) Bangabasi, 38½, Bhawani Dutt Lane; (4) Ititabadi, 70, Colootola Street and (5) Sanjibani, 6, College Sqr.

492 J. N. Prasad.—Machine for husking paddy may be bought of Marshall Sons & Co., Ltd., 99, Clive Street, Calcutta. Pulse splitting machines may be supplied by W. Leslie & Co., 19, Chowringhee, Calcutta. Grinding and oil pressing machines may be had of Burn & Co., 7, Hastings Street, Calcutta. Oil engines may be bought of Heatly &

Gresham Ltd., 6, Waterloo Street Calcutta.

493 Commonwealth Commercial Corporation.—It is very difficult to say which firm in foreign countries will take 'neem' oil for manufacturing soap. It will be advisable for you to write to Bengal Chemical & Pharmaceutical Works, 15, College Square; Calcutta Chemical Co., 35½, Panditia Road, Ballygunge and B. K. Paul & Co., 1-3, Bonfields Lane; all of Calcutta to that effect.

495 Bhag Singh.—Cardboards are manufactured by Bengal Paste Board & Paper Mills Ltd., 8, Old Court House Corner, Calcutta. Cardboards may be bought of Ghosh Brothers, 63 J, Radha Bazar Street; Purna Chandra Kundu & Sons, 139, Old China Bazar Street and Bhola Nath Dutt & Sons, 134, Old China Bazar Street; all of Calcutta. Cardboards may be supplied by A|B Agora, Goteborg; A|B Ekman & Co., Goteborg and A|B Hugo Hartig, Stockholm; all of Sweden. Electrical goods, such as bulbs, switches, etc., may be supplied by Franz R. Conrad, Glogannerstrasse 19 21, Berlin S. O. 36, Germany; American National Commercial Co., 79 W, Monroe Street, Chicago, U. S. A; Ward & Goldstone Ltd., Frederick Road, Pendleton, Manchester and The Hart & Hegeman Mfg., Co., Hartford, Connecticut U. S. A. Wants to know the address of the agent of Elysium bulb.

496 M. Arunachalam Pillai.—Tin boxes may be bought of Gajanand Rampratap & Co., 6, Harsi Bagan Road, Calcutta.

497 A. V. N. Chikli.—Small machines for cigarette making may be bought of Oriental Machinery Supply Agency Ltd., 20½, Lall Bazar Street, Calcutta. Tin foils may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

500 S. Subbaiah Setty.—Sewing machines may be supplied by H. Ahlers & Berg. G. m. b. H. Kiel and Hermann Beier & Co., Karlstrasse, 24, Karlsruhe; both of Germany. Please write clearly

what other things you wish to indent from Germany.

502 Tin Maung Bros.—Desire to be put in touch with dealers in *Kala haldi*, *Kala bilh* and *dulingi* of the Bhotias of Katmandu, Nepal, Calcutta and Bombay. Black zedoary is chiefly used as cosmetic. For black zedoary enquire of Bansidhar Dutt, 126, Khengraputty, Bara Bazar, Calcutta.

503 K. P. Singh.—Can supply tamarind, semul cotton and harsingar flowers.

506 Joob Singh.—For particulars regarding diseases of sheep consult a veterinary surgeon.

507 Jaswant Rai Ramta.—For making fly paper crispy try with a paint of varnish at the back. Papadams are called *paparh* in Bengali. For pulse meals enquire of Jogindra Nath Das & Co., 25, Pollock Street, Calcutta. Aluminium utensils cannot be soldered. For biscuit moulds enquire of Calcutta Industries Ltd., 71, Canning Street, Calcutta.

509 V. S. Ranga Rao.—To remove the colour stain from silk moisten the stain with strong white wine vinegar and rub some warm beech-wood ashes upon it, and finally wash with soap water. Should the colour suffer from the vinegar, mix some beef gall and water and wash the stain with it.

510 Gopimal Durgadas.—For the address of trade journals write to the British Association of Trade and Technical Journals Ltd., Sicilian House, Southampton Row, London W. C. 1.

512 Janak Singh Jagadish Narayan Singh.—Sock making machines may be bought of Economic Hosiery Mills, Ltd., 55½, Dharamtala Street, Calcutta.

514 Gandhi Dahyabhai Samalbhai & Co.—Books on veterinary science may be had of Butterworth & Co., 8, Hastings Street, Calcutta. For country produce write to Jogindra Nath Das & Co., 25, Pollock Street, Calcutta. Want a German make waste machinery expert.

518 Himalayan Boot Factory.—Boot lace knitting machines may be supplied by Oriental Machinery Supply Agency Ltd., 20½, Lall Bazar Street, Calcutta.

519 J. H. Siddeequi.—The process of refining fish oil consists in demargarinating and then filtering the clear oil through charcoal to bleach. Occasionally a treatment with concentrated soda lyes to remove free fatty acid and improve the colour is conducted.

520 A. M. Coirmick.—Wants to purchase pure bred Angora goats.

523 Sri Laxmikantham & Co.—Probably the German Reparation Commission has been dissolved and Reparation Dyes are not available now.

524 Jaswant Rai Ramta.—The sample you sent is a part of celluloid toy. These are not manufactured in India and are mostly imported from Germany and Japan. These may be bought of K. B. Nan, 234, Old China Bazar Street, Calcutta. Aluminium sheet may be supplied by Balmer Lawrie & Co., 103, Clive Street, Calcutta.

526 Multan Soap Factory.—Palm oil is largely manufactured in South Africa. As an experiment you may try with shea butter instead of lard in soap making. There is no such school where soap making is taught free of charge.

527 Lalita Prasad Saksena.—Optical goods may be supplied by Asanuma & Co., 16, Hencho Nichome, Nihonbashiku, Tokyo, Japan; General Optical Co., Inc, Mt. Vernon, New York, U. S. A.; British Ocentric Optical Co., Ltd., 12 and 13, Eagle Street, London W. C.1 and The Eastern Optical Co., 2, 3 and 4, Workmen's Hall Bldgs, Ramford Road, Startford, London, E. 15. Indian addresses appear elsewhere in these columns.

528 B. Govindasami Chetty & Sons.—All the weaving accessories may be bought of Textile Machinery and Stores Co., 61, Apollo Street, Fort Bombay.

530 Jaswant Rai Ramta.—Replies to your queries appear elsewhere in these columns.

534 Gh. Rangayya.—The address of G. M. Shaw & Co., is not known. The tablet sent by you is missing.

535 K. M. Sonadva.—Glass grinding machines may be supplied by Oriental Machinery Supply Agency Ltd., 201, Lall Bazar Street, Calcutta. Glues may be had of M. P. Gupta, Cawnpur. About Rs. 2,000 will be required for starting glass paper making industry.

536 Madhu Sudan Roy.—Recipes of ready-made sherbat appeared in the last issue. For manufacturing syrup you may consult Manufacture of Syrup published from this office.

537 Malik Hiranand Sons.—Desire to be put in touch with suppliers of gas filling apparatus for balloons preferably of Bombay.

538 V. E. Obed and Sons.—Want to be introduced to dealers in magas.

540 M. S. Madha.—Iron bolts, hinges, nails, etc., are mainly imported from Europe. Caustic soda, soda ash and bicarbonate of soda are manufactured by Bengal Chemical and Pharmaceutical Works Ltd., 15, College Square; Calcutta Chemical Co., Ltd., 351, Panditia Road, Ballygunge; both of Calcutta and Eastern Chemical Co., Ltd., 15, Doughall Road, Ballard Road, Bombay. Wire nets are manufactured by Indian Wire Netting Factory, 7-15, Narkeldanga Main Road, Calcutta. Cotton waste may be supplied by Textile Machinery and Stores Co., 61, Apollo Street, Fort Bombay.

541 Chandra Narayan Sinha.—For moulds and other equipments of brass foundry write to De and Dutt, 78, Manicktala Street, Calcutta. For books on the subject enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta.

542. Daulat Ram Vidya Parkash Sud.—For learning mail order business go through Mercantile and Mail Order Letters and Methods by K. M. Banerjee, to be had of Book Dept., Industry Office, Shambazar, Calcutta.

543 V. S. Ranga Rao.—Pocket type writer may be had of The General Store,

Khatoli, Kotah, Rajputana. For gas pistols enquire of K. B. Nan, 234, Old China Bazar Street, Calcutta. For speaking clock try Continental Novelty Stores, Post Box 1262, Madras. There is no such duplicator in which type written copy is used.

545 Nanan Chand Chopra.—For fodder presses enquire of Oriental Machinery Supply Agency Ltd., 201, Lall Bazar Street, Calcutta. Desires to know the address of second-hand clothing dealers of foreign countries.

546 Trilok Narayan.—Process of enamelling sign plates appeared in March 1923 issue.

547 Malik Hiranand & Sons.—Your name has been entered in our office directory.

552 Modern Agency.—Your enquiry being in the nature of an advertisement should not be published in these columns.

553 Hedayat Husain.—Formula of washing soap will be found in May 1924 issue.

554 Anant Ram Sharma.—Cardboard is manufactured on a small scale. For further information on the subject refer to No. 495 above. A vast sum of money will be required for manufacturing cardboard in India.

555 Satyendra Mohon Chowdhury.—Tried formulas of hair oils will be found in Hair Oil Manufacture published from this office.

556 Hemendra Nath Gupta.—For ink tablets use gallnut powder instead of alum powder. An article on rose water appeared in the last issue. Recipe of Eau-de-Cologne appeared in September 1924 issue. For hair oil see above. Process of preparing quinine tablet will appear in an early issue.

557 Chandik Prasad.—Your enquiry is receiving our attention.

558 Mangelal Sharma.—In your previous letter you enquired for addresses of match splint and veneer dealers which appeared in February issue under No. 2971. Paper may be bought of Ghosh Brothers, 63J, Radha Bazar

Street, Calcutta. Chemicals may be supplied by Oriental Industrial Co., 9, Bonfields Lane, Calcutta.

559 P. B. Raju & Co.—Yarns of medium counts may be supplied by E. B. Bros & Co., 4, Dharamtala Street and Sukdeo Ram Misra, 2/12, Cross Street; both of Calcutta.

560. Bhagwat Brothers.—Formulas of inks of various kinds appeared in November 1922 issue.

562. M. Qadir Bux & Bros.—Vulcanizing machines may be supplied by United Machine and Manufacturing Co., Canto, Ohio; Williams Foundry and Machine Co., Akron, Ohio and Akron Rubber Mold and Machine Co., Akron, Ohio; all of U. S. A.

563. R. Muttiah.—Match making machines may be supplied by Bhawani Engineering & Trading Co., 122/1, Upper Circular Road and Bengal Small Industries Co., 91, Durga Charan Mitter Street; both of Calcutta. Recipes of match compound will be found in September 1923 issue.

564. Royal Advertising & Manufacturers' Agency.—For printing on aluminium sheets enquire of Manz Engraving Co., Chicago, Illinois and Dunlop Printing Co., Philadelphia, Pennsylvania; both of U. S. A. You may consult Industrial & Trade Review for India, Charlottenburg, Reichstrasse 104, Berlin, Germany; Commercial America published by Philadelphia Commercial Museum, Philadelphia. For information regarding jute trade go through January 1925 issue of COMMERCIAL INDIA the sister journal of INDUSTRY. For starting a touring dramatic company seek expert advice from men in this line. You may

German Aniline Dyes, and Chemicals
of the well-known manufactures—

MESSRS. LEOPOLD CASSELLA & CO.,

Largely consumed by big Industries, such as Jute,
Silk, Cotton, Wool, Leather, Paper, Inks etc

—STOCKISTS—

MESSRS. FAZLEHUSEIN & BROTHER.

44, Armenian Street, Calcutta.

go over Bioscope published at Faraday House, 8-10, Charing Cross Road, London W. C. 2. Your name has been entered in our office directory for future reference. Your other enquiries are in the nature of advertisement; so these should not be published in these columns.

565. Jaswant Rai Ramta.—For list of exhibitions and fairs held regularly in India write to the district officers of all articles of the country. Porcelain articles may be bought of Calcutta Pottery Works Ltd., 45, Tangra Road, Calcutta; Gwalior Pottery Works Ltd., 2/A, Radha Prasad Lane, Sukea Street, Calcutta and Mukherjee's Oriental Art Syndicate, Uttarpara, Howrah.

566. P. N. Mahatra.—For rapid sale of the medicine prepared advertise in the pages of widely circulated papers such as INDUSTRY. For a list of provincial newspapers to insert advertisement write to Calcutta Advertising Agency, 15, College Square, Calcutta.

569. Periyapatna Mallappa.—Thread-ball making machines may be bought of Calcutta Industries Ltd., 71, Canning Street and Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street; both of Calcutta.

570. Khushaldas Mangatram & Co.—After powdering sugar mix some water to moisten it.

573. P. G. Sadhwani & Co.—For rubber toys enquire of Fulton Specialty Co., Elizabeth, New Jersey; Miller Rubber Co., Akron, Ohio; (both of U. S. A.) S. Maramgoni, via Jaures 182, Bologna and Capra Carlo, via Sambuco, 15, Milan; last two of Italy. Boots and shoes may be purchased of M. D. Ghuznavi & Co., 57/1, College Street and National Tannery Co. Ltd., Pagladanga, P.O. Entally; both of Calcutta.

574. M. R. Russel & Co.—We do not deal in directories; Indian Directory may be bought of Thacker Spink & Co., 3, Esplanade East, Calcutta.

576. A. Paul John.—For ink bottles enquire of Satya Charan Paul, 194, Old China Bazar Street, Calcutta.

578. Gendamul Ramsarup.—Dhoties may be supplied by Beinraj Hookumchand, 30, Cotton Street, Calcutta; Panchiram Nahata, 177, Harrison Road, Calcutta and Bhukandas Govindji & Co., 48, Meadows Street, Bombay.

580. M. C. Merchant.—Trade enquiries are not generally repeated. Moreover we have redirected many letters to your address which falsifies your statement.

581. Shaik Ahmad.—Addresses of optical goods suppliers appear elsewhere in these columns.

583 A. Paul.—Any disinfectant fluid will serve your purpose. Eggs are generally sold at Calcutta market at 10 as per score. You may have the packing box prepared by local carpenters as per order. It will not be suitable to export eggs abroad. For further particulars write to Mr. Satish Chandra Das Gupta, Daulatganj, A. B. Ry.

584. Vithal Kesheo Jagtop.—Motor oil may be bought of Asiatic Petroleum Co. Ltd., 10, Clive Street, Calcutta. Wants to be put in touch with dealers in Dhrandhru stones.

585. Monohar Lal Bhatnagar.—Platina may be supplied by B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. Platina can be melted by electric furnace.

586. Kishor Chand.—For sewing machine parts enquire of Davis Sewing Machine Co., Dayton, Ohio and New Home Sewing Machine Co., Orange, Massachusetts, U. S. A.; H. Ashers & Berg G. m. b. H. Kiel, Germany and Hermann Beier & Co., Karlstrasse 24, Karlsruhe, Germany. Wire nail making machines may be supplied by National Machinery Co., Tiffin, Ohio, and Sleeper & Hartley Inc, Worcester, Massachusetts; both of U. S. A.

587. Prokash Chandra Sircar.—You may go through Bioscope published at Faraday House, 8-10, Charing Cross Road, London, W. C. 2. Magic lantern and slides may be supplied by Davis

Steward Manufacturing Co., Ltd., 410, St. John Street, London, E. C. 1, and Newton & Co., 37, King Street, Convent Garden, London W. C. 2. Offices of industries departments of provinces are established at head-quarters of those provinces.

588. Balaram Prasad Sinha.—You may consult Soap Making by A. Watt to be had of Chackraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

589. V. Periyaswami Chettiar.—You should procure wood for match making locally. Any wood of straight fibre will do good in match making.

591. A. S. Gurukambal.—Do you mean washing soap by Chinese washing tablets. Formula of washing soap will be found in May 1924 issue.

593. P. R. Chetty.—Process of glazing earthenwares appeared in September 1924 issue.

594. G. Krishnaswamy Naidu.—Waxes may be supplied by Bansidhar Dutt & Sons, 126, Khengraputty, Bara-Bazar, Calcutta. Paraffin and other chemicals and dispensing materials may be had of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. Tablet making machines may be bought of Calcutta Industries Ltd. 71, Canning Street, Calcutta. Remington typewriter machines may be purchased of Remington Typewriter Co., Council House Street, Calcutta. Photo-goods may be supplied by Calcutta Camera House, Chowringhee, Calcutta.

596. Gruning-Soghra H. E. School.—Process of preparing duplicator appeared in June 1924 issue.

597. M. P. Gomez & Co.—Recipes of red marking ink appeared in September 1923 issue.

599. E. E. Kennedy, Box 76 of G. P. D, Brishane, Australia.—The articles referred to in the Scientific Topics columns of INDUSTRY are still in their experimental stage and these have not been put in the market. Hence their addresses are not known.

600. Somjeevanarayan.—For starting prospective small industries go through September 1923 issue of INDUSTRY.

603. 'G. Govindrao.—Make a strong solution of chloride of lime in water and allow to settle, and draw off the clear liquid. Rinse the cloths in clean water, containing about 5 per cent. of sulphuric acid and then pass them slowly through the bleaching solution. They should then be well rinsed in water containing a little carbonate of soda. If the cloth is much coloured it may be necessary to allow it to remain for short time in the bath. This is the usual method of bleaching cloths. Process of sizing cloth appeared in December 1924 issue. For cloth printing machines enquire of Textile Machinery & Stores Co., 61, Apollo Street, Fort, Bombay. Diamond Jubilee Washing Co, Humum Street, Bombay clean and dye cloths. Process of preparing tea tablets appeared in July 1923 issue.

605. Royal Advertising & Manufacturers' Agency.—Wants to know the address of Prof. Mohamed Chhail & Charles, J. Carter, the renowned magicians of India and America respectively. Your other queries have already been dealt with.

606. K. Srinivasulu Naidu.—Recipes of coloured printing inks appeared in May 1919 issue. For dyeing cloth with fast colour consult December 1924 issue. Recipes of hair dyes will be found in January 1925 issue. Formulas of *Khañi* dyeing appear elsewhere in this issue.

607. Nirmal Ch. Bose.—Condensed milk needs 'no special treatment for preserving.

608. All-India Occult House.—Recipes of snow creams appeared in July 1924 issue.

610. State Printing Works.—For coconut fibre extracting machines enquire of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

611. S. Raja Gopal Pillai.—Tamil equivalents of cardamom major are Periya-Yelakkay and Kattu-yelak-kay. Other articles mentioned by you are of foreign origin therefore their vernacular equivalents are not known. Refer to No. 603 above.

612. Kamrudin Umaria.—Kieselgurh may be bought of any chemist, you may however try B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

613. B. B. Chowdhury & Chatterjee Bros.—To dispose of ivory, elephant bone, etc., write to Matri Bhandar, 206, Cornwallis Street, Calcutta. The best course for you will be to advertise in the pages of newspapers and periodicals.

616. Kolluru Satyanarayana.—From your queries it appears that you desire to manufacture hair oils which have been very lucidly treated in the booklet-Manufacture of Hair Oils published from this office! Deshi Rang by P. C. Roy may be bought of Book Co. Ltd., 4/4 A, College Square, Calcutta. Alkanet root is an indigenous product mostly used for colouring hair oils, etc. Alkanet root may be supplied by Bansidhar Dutt, 126, Khengraputty, Bara Bazar, Calcutta. The first part of the article on Extraction of Odour will be found in October 1919 issue. Process of purifying gold appeared in October 1923 issue. Formulas of lime juice glycerine will be found in August 1921 issue.

617. C. M. Gopalkrishna Iyer.—For starting an advertising agency you should send circulars to the parties who advertise in the pages of newspapers and periodical for selling their goods. The main duty of an advertising agent would be to secure advertisement.

618. Modern Pratap.—A simple cement for glass may be made by making a paste of casein and water glass.

619. Johnston S. Gonsalviz.—For starting a small industry please go through September 1923 issue.

620. Mehor Chand.—For clays of various types enquire of Williamson & Co., Oldham Road, Gaya and Calcutta

Mineral Supply Agency, 31, Jackson Lane, Calcutta. Sponges may be supplied by B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

621. F. H. Silkkawala.—For books on electric fittings enquire of Chackraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

622. L. A. S. de Silva.—Printing machines may be supplied by Printing Machines Co., Cincinnati, Ohio, U. S. A.; Babcock Printing Press Mfg. Co., New London, Connecticut, U. S. A.; Miehle Printing Press & Mfg. Co., Ltd., Blackfriars House, New Bridge Street, London E. C. 4 and The Model Printing Press Co., 41, Farringdon Street, London E. C. 4. For German printing machines enquire of Eastern Engineering Works, Shambazar, Calcutta. For electrical goods enquire of Mukherjee Bros, 6/A, Boloram Ghosh Street, Shambazar, Calcutta.

623. Balmokand Sethi.—Recipes of luminous paint appeared in the last issue. Luminous calcium sulphide may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. Without any instrument high temperatures cannot be recorded. When dissolved yellow phosphorus is liable to lose its luminosity. Try to secure oyster shell and hypopus vulgaris locally!

624. Nalam Kameswara Rao.—For German steel handsticks enquire of Singh Sarkar & Co., 125, Harrison Road, Calcutta. For glass tubes enquire of F. P. Nalladaroo & Co., 50/1, Canning Street, Calcutta. Umbrellas may be bought of Nafar Chandra Atta, 43, Armenian Street and Tejpal Bredhichand, 7/1, Armenian Street; both of Calcutta. Erasmic soaps may be bought of Najmul Arifeen & Co., 71, Colootola Street, Calcutta.

NOTE.

Our subscribers who want any missing copies of "Industry" of the last volume i.e., Vol. XV to complete the same should write at once to the Manager, Industry Office quoting their roll numbers.

Notices and Reviews.

Red Marking Ink.

The 'Crescent Brand' Red Marking Ink of Messrs D. Batcha & Co., 1, Jones Lane, Madras, E. will be found serviceable

Siddha Laxmi Vilas.

Described as the Home Doctor this is a superfine oily preparation intended for skin diseases. Its sole agents are Messrs. Pai Brothers, Shahapur, Belgaum

A German Paper.

Those of our readers who wish to trade with Germany will derive benefit from The German Export Paper "Export-Anzeiger" obtainable from The Students' Co-operative Stores, 3833, Maithan, Agra, (U. P.)

Magic Writing Pad.

The magic writing pad sent us by Messrs T. Lakshminarayana Chettiar & Sons, Tiruvadi P.O., Tanjore Dt., is a useful novelty as anything can be written on it without pen and pencil.

Marking Ink and Gas Mantle.

"Atol" is the name of a red marking ink and "Glowel" that of a gas mantle both prepared by Messrs. Tandan Brothers, 32, Latouche Road, Lucknow. Both the products are of good quality and we wish their wide sale

A Correspondence Institution.

We have gone through the prospectus of the India School of Accountancy, Post Box 2020, Calcutta with interest and noted its progress with satisfaction. Its curriculum comprise a wide range of commercial subjects by qualifying in which profitable careers may be chalked out in business line.

A Correspondence Course.

Eight Big Plans. By R. Seshan, Srirangam Post, Trichinopoly.

These are novel ideas set forth in an attractive form and by acting on which lucrative businesses can be built up. The published price is Rs. 8 but readers of Industry will get the book for Rs. 2½ only.

A Trade Journal.

The Manufacturers' Service and Industrial Review, Tinnevelly Junction, South India

The Journal has been inaugurated with the laudable object of linking merchants to manufacturers thereby promoting Indian industries. The first issue contains many useful articles of practical utility. We wish the journal every success.

A Valuable Biography.

W. C. Bonerjee: His life, letters and speeches. By Krishna Lal Bundopadhyay, B.L. Vakil, High Court. Pp. 85. As. 5 only.

As one of the founders of the Indian National Congress the name of the late Mr. W. C. Bonerjee will remain ever memorable in the political history of India. But not only was he a far-sighted statesman but also a legal luminary of the first order, while his character is worthy of emulation alike in private life as in public. This short well-written biography of a notable personality of a past age holds out an object lesson to the present generation.

A Useful Institution.

Sir Ganga Ram Business Bureau and Library, MacLagan Road, Sleem Buildings, Lahore, (Punjab).

JUNE ISSUE OF INDUSTRY.

(In the press.)

The June issue of INDUSTRY, which will appear on the last day of the month will contain articles on Flour milling, Starch making, Glass blowing, etc., in addition to the usual features such as New Ideas, Small Trades, Formulas. Any friend of our subscribers may get a copy free as sample on application to the Manager, INDUSTRY, Shambazar, Calcutta.

This useful institution, which is run under the supervision of Sir Ganga Ram Trust Society, has been started to place within the reach of the youngmen literature and information calculated to fit them for life in agriculture, industry, trade and commerce. It is thus rendering valuable service for the economic uplift of the country.

Trade Enquiries.

To communicate with any party address him by name and number under care of 'Industry' when the letter will be duly redirected.

408 H. S. Khosla & Co.—Desire to be put in touch with dealers in pepper, chilly, almond and turmeric in India.

412 Basant Lal Agarwal.—Can supply kapok cotton in very large quantities.

432. B. P. Srivastava—Wants a capitalist mechanic to construct a new pattern spinning machine the design of which has been invented by the enquirer.

502. Tin Maung Bros.—Wish to be introduced to dealers in "Kala holdi," "Kala bikh" of the Nepalese and dulingis of the Bhotias in Katmandu, Calcutta and Bombay.

503. K. P. Singh—Desires to be put in touch with dealers in tamarind, semul cotton and Harsingar flowers.

529. Maharaj Behari Lal Suksena.—Can supply mica and raw lac in very large quantities.

532 M. Sen Choudhury.—Wants to be put in touch with dealers in tea seed, ivory and elephant bone.

551. Mir Ali—Wants to be introduced to pillow and mattress feather suppliers.

595 R. N. Roy—Can supply "Vapti" leaves used for manufacturing colour.

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At the time of sending a V.P.P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V.P.P. For particulars and Advt. rate please write to—

Manager, INDUSTRY OFFICE,
Shambazar, Calcutta.

THE COUNTRY IS BEHIND IT

In these democratic days India does not tolerate anything which has not public approval. Otherwise she will become the dumping ground for a hundred and one worthless things. Especially will it be so in the case of medicines sold in public. Being the vehicle of health to the unhealthy, they should carry with them a guarantee of PURITY, SAFETY and EFFICACY. If the public has shown its approval of the medicines it is proof that the country is behind them. This Valuable approval of the country has been secured to the medicines of

The Madras Ayurvedic Pharmacy, Limited,

in a remarkable degree. Ever since 1915, when it was started, public appreciation of its medicines has been growing in volume. The climax was reached in December 1924, when THE INDIAN NATIONAL CONGRESS, the real representative of the country set its seal of approval on the Pharmacy's preparations.

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Our SENIOR PHYSICIAN and Managing Director, Ayurveda Ratna Pandit, Dr N V SRIRAMACHARLU, Ph. D Sc., will give your communication his personal attention.

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Druggists of Southern India
Patronised by Prince and
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• Five Branches in Madras City.

NOT ONCE, NOR TWICE!

Not once, nor twice in our Business Story the path of Industry has been the way to Victory!

What a part has INDUSTRY played in the story of Indian Business! Not once, nor twice but many times have struggling businessmen buffeted by slump or loss, sought the help of the advertising pages of INDUSTRY and found the way to victory. It thrills us to hear these stories of business success. They will thrill you too and perhaps, make you wish you had your own story to tell!

Prof. Sekhar, Ellore, who advertised in half-page space in our last December issue writes under date 10-4-25:—

"I am glad to say that my last advertisement in your Industry has brought in quite a large number of orders. I am sending you by to-day's post one full-page advertisement for insertion in your April issue."

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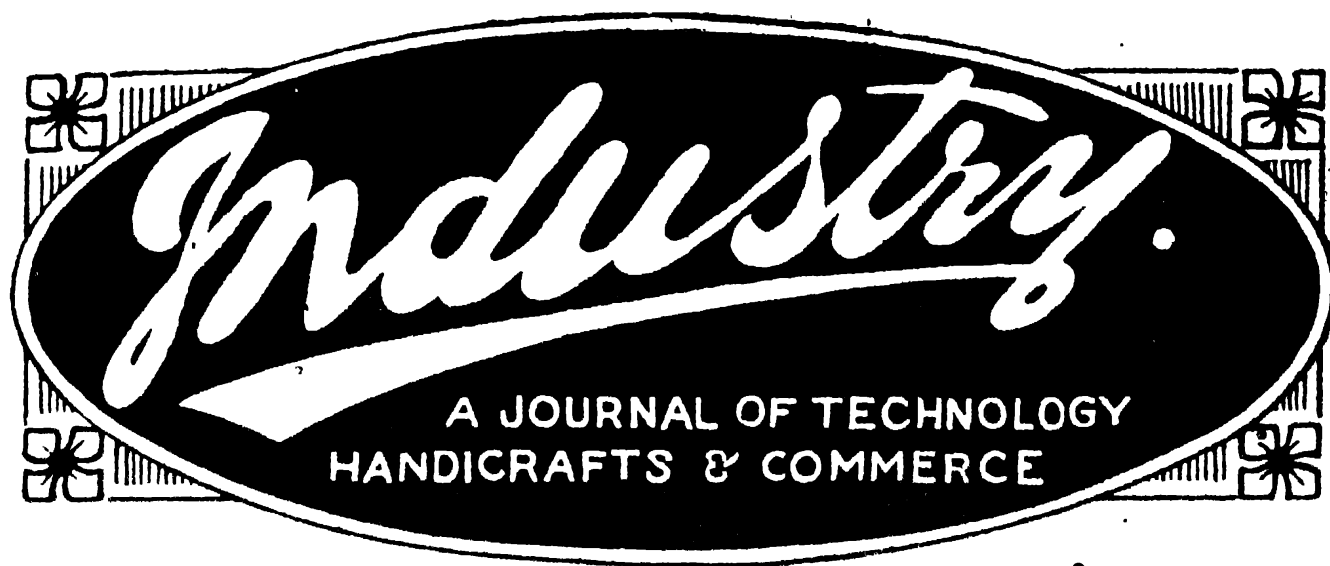
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When every thing seems to be a flame and we are parched and grilled and baked how refreshing is a cold, delicious drink! With every sip you drink in life With every glass you send a fragrant balm, a soothing joy down to the very depths of your being Prepare these drinks with the help of a copy of

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Industry

A JOURNAL OF TECHNOLOGY, HANDICRAFTS & COMMERCE,

VOL XVI.

CALCUTTA, JUNE, 1925

NO. 183

PASSING OF DESHBANDHU.

All India has received with profound sorrow the news of the sudden, unexpected and entirely untimely death of Deshabandhu Chittaranjan Das, one of the most brilliant lawyers, a self-less philanthropist, the First Mayor of Calcutta, the great Nationalist leader and one of the most distinguished sons of the Motherland, who passed away at "Step Aside" in Darjeeling on 16th June 1925 in the afternoon.

DESHABANDHU has passed away and

Mahatmaji wishes "long live Deshabandhu." A great student, a great scholar, a great lawyer, and a great leader of man—Mr Das has been snatched away in the midst of his success from among the love of his countrymen. A towering personality in his political lead to the country, in the pinnacle of success in his policy of obstruction, when the aimed at destruction of the Reforms had been effected Deshabandhu was being looked upon by his countrymen to pioneer the constructive work in the villages which are in a fearful state of decay and where over 90 per cent. of our population are breathing the impure air, poisoned with insanitation, illiteracy, and consequent dissension.

Mr. Das was indeed the right man and would have been in the right element

to come down as an angel of construction on our old already destroyed village system and out of the same evolve a reconstruction compatible with our needs and conditions.

Complete was our village system prior to the establishment of towns and cities drawing their sustenance from the rich elements of the villages, prior to the advent of foreign manufactures destroying our village industries, village handicrafts, together with the village artisans. The villages have now come into connection with the markets of the world exporting their food products together with the life blood of the villages. Yet with the destruction of the old organisation on which the life of the villages was dependent without any effort at re-organisation on the lines of modern necessities the villages have become

grave of the nation vitiating its life-blood, killing the manhood by poverty and disease, ingenuity of the nation by illiteracy and rural dissension. And as the old merry villages are being ruined the more well-to-do classes are gradually leaving them to flock to the big cities augmenting the unemployed populations hankering after employment which nowhere can be found.

Deshabandhu like the real friend of the country had his attention drawn to the phase of the rural life and when, the success in his policy of obstruction assured, he was preparing to turn his unbounded energy to reconstruction of the nation from its cradle—the villages. Although hampered by his unfortunate illness for sometimes, schemes were being prepared and Deshabandhu was injecting his dominant spirit into his party to work the reconstruction work when the cruel hand of death, so suddenly, so unscrupulously, so unsuspectingly snatched him from the nation. But as Mahatmaji pointed, his great spirit guiding us, the onward march of the nation must not be stopped. Amid his fearlessness and generosity, his great renunciation and sacrifice, the hovering spirit of the departed great urges us to put double speed to the work of reconstructing the nation which he himself had not the time to undertake. And in peace may the great soul repose when the idea put before the nation of recons-

truction is carried in full force and unity.

And what the construction work demands. (1) A scheme of education in the villages in which every village boy can be made to join irrespective of his father's occupation, by which he will be taught to be a gradually improving helping hand to his father in all stages of his studies.

(2) A scheme of education in which every grown up villager will look to, day by day as his education progresses, as a helping hand to his occupation and trade which will make him a better man for his trade.

(3) A scheme of education which will make the womenfolk dependent upon self for making a living for themselves and enable them to add even a little quota to the family income.

(4) A scheme of sanitary organisation which will improve the childhood to grow into vigorous manhood and womanhood, healthy and strong, and long living to do the nation's works.

We defer to detail the scheme of construction for a future issue. Every one of the nation we are confident would feel the inspiration of the great soul and before the burning fire of homage in every heart slackens, would make up the mind to carry out the idea of making the nation great and liberated so courageously conceived by him. Let his spirit inspire and guide till the goal is reached.

FLASHLIGHT OF CHANCES.

What are you working for? "Money" is the ready answer. But it is the wrong one. "To make a living," replies the man who has thought a little deeper. Wrong again. All the money in the world wouldn't do you any good if you couldn't spend it. And to make a living you needn't work as hard as you are doing.

You are working for something more. You are working for life's surplusage. For the non-essentials, for everything that is not necessary to your existence. And the more you work for what you do not need the better are you doing your duty. Do not delude yourself by thinking that you are going to make the best use of life, merely by doing your routine work—the work to make a living. Without some external aim, some driving purpose which impels you to do more than you need to do you will find life rather a dull grind, after the first eagerness and enthusiasm of youth has worn off. What is more you will never make a big success of your work, unless you are working for the freedom and power to do something else.

Shape your business efforts with that end in view. Develop your business so that you may have more than you need, so that not one, nor two but a hundred lines may be yours, so that you may have non-essentials which you may not need but which may be turned into the necessities of a hundred other lives.

Is it safe to buy from friends? Does it pay to sell to a friend? Do you know what is "Business Friendship"?

Well, "Friendship" in its business definition is not your social relation. It is not founded upon feasts, cigars, luncheons, invitations garden-parties or other entertainments. No, nothing of the kind. The firmest Business Friendship may not have in it the slightest personal friendship. If you are trading for yourself you will naturally buy from people who you know by experience will treat you properly. Whom you will pay the price and have your goods. But "price" includes more than rupees, annas and pice. It includes quality. It includes delivery. Every price is made up of three factors—the amount of money asked, the quality assured and the time of delivery promised. The last of these may not be always of the same importance as the first two but it is a factor still. When you buy from a friend you must pay the proper amount and have the right goods. You mustn't expect the price to be a pice less than what another pays. You must not pay less nor have less. This is business Friendship. This is what business friends do. This is what they expect.

Many people favour holding to business friends. They will not be caught by a sharper or the fellow who gives second-rate goods. They will buy from business friends and so long as they continue to be friends. They mark the end of business friendship when the other man presumes upon his long dealing to give you something less than another. Business friendship dies when you begin to expect you should pay less than another. When this point is reached, business friendship ends and favouritism begins.

Favouritism has no place in most businesses. It should not have a place in any business. Favouritism is destruction to system and organisation. Business friendship promotes the growth of business. Favouritism kills it outright.

It tickles my ribs. Yes, it tickles—this story of a villager which I heard not long ago. This man was running a small hardware shop in his village and the city wholesale dealers who supplied him with stock on credit found him backward in payment of his accounts. 'They sent him letter after letter, each more threatening than the last, but to no effect. Finally they sent their representative down to meet him.

"Now," said the representative, "we must have settlement. Why haven't you sent us any remittance? Are things going badly?" "No, every thing fine. You needn't worry."

"Then why haven't you paid up?"

"Well, you see, those threatening letters of yours were so well written that I have been copying them and sending them out to those customers of mine who won't pay up and I have collected all my money without having any collecting Sircar or going to court for the purpose. Your letters were saving me the trouble and expense. And so I didn't want to stop them with any reply or remittance."

Fine! But the trouble is the creditors instead of sending a representative often send another man. They call him Mr. Bailiff!

As for myself, well if anybody, asks me whether we should have things on credit I would say no! Emphatically no! To have a thing on credit is to be

a debtor. It might be for a week, a day, nay an hour! Still it is to be a debtor. And just think what you do when you run into debt. You give to another power over your liberty! If you cannot pay at the time, you will be ashamed to see your creditor! You will be in fear when you speak to him! You will make poor, pitiful, sneaking excuses! And by degrees you will come to lose your truthfulness and sink into base, downright lying!

Success in any vocation lies not only in study, in continuous work, but in watching the achievements of successful men. Studying their ways, manners and such ideas as they promulgate for their own welfare may possibly give us the right clue to our own advancement. Their advice is not so sure a guide as their own acts. To help me over the problems and difficulties and trials that all men must encounter, my plan has always been to pick from the motely crowd one merchant and follow his methods wherever they are applicable to my business. If possible to improve upon them, to make them suit the peculiarities of my line.

But I have found it hard to pick one man who will answer all emergencies—one who might be called an "ideal." My ideal—my guiding star—has been a composite one, consisting of many persons. For instance. I know a man whose success has been attained by advertising. I make it a rule to watch closely his methods, his movements, his developments. And when possible I keep in touch with him by interviews and correspondence.

BEE.

EXTRACTION OF VEGETABLE OILS.

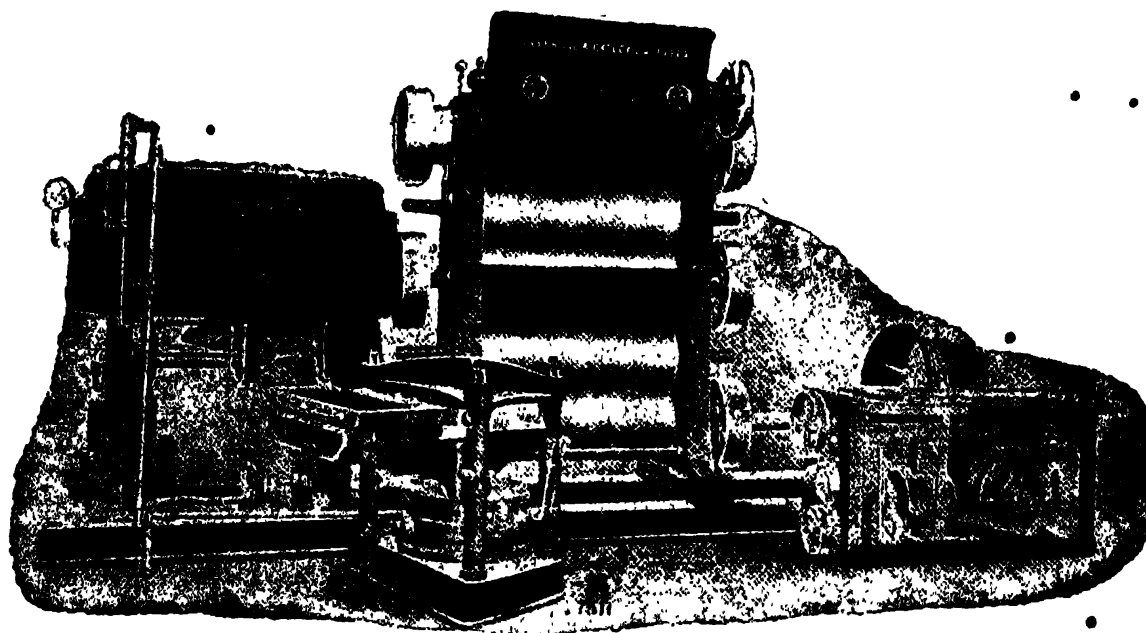


Fig. 1 Complete Oil Mill with Roller.

BROADLY speaking, there are two methods of extracting fatty oils from vegetable products—one, that employing pressure, being purely a mechanical process, and the other, that extracting the oil by means of solvents, being more or less a chemical process. Under the first method the seed, if small is simply crushed in a hydraulic press. The oil forced out of the seed is caught and drained off. If the seed is large or if the raw material is copra or some such stuff, it is first ground up in special machines before being crushed. The seed or seed “meal” is sometimes heated during the process of crushing. The oil then produced is known as “hot pressed” or “hot drawn” oil. Such oil, however, is apt to be unduly discoloured by reason of its having dissolved from the seed during expression an excessive amount of colouring matter. For certain purposes,

therefore, notably for edible purposes, “cold drawn” oil is preferred. The “cold drawing” process usually leaves quite a considerable quantity of oil remaining behind in the seed. Consequently it is a common practice to break up the cake left in the press after cold drawing, heat it and extract a “second expression oil” by the hot process.

The second process extracts the oil from the seed or seed meal by means of chemical solvents, the seed being treated either hot or cold. The three chief solvents in use are benzene, carbon disulphide, and carbon tetrachloride. The process in outline consists of allowing the solvent to percolate through the seed or meal in a closed vessel, draining off the solvent and dissolved oil, transferring it to a heated still and there driving off the volatile solvent so as to leave the oil behind. The solvent is condensed and re-used.

The machinery and plant used in the production of vegetable oils are broadly divided into four classes:—

(1) The preparatory machinery. This plant deals with the seeds, nuts or fruit as received from the growers, and reduces them to a form suitable for treatment in the subsequent oil recovery processes.

(2) The presses. Herein the material prepared as above is crushed.

(3) The plant employed when the oil is extracted by chemical solvents.

(4) The plant employed to refine the oil.

There is still another class of machinery which is concerned with the production and treatment of the cake.

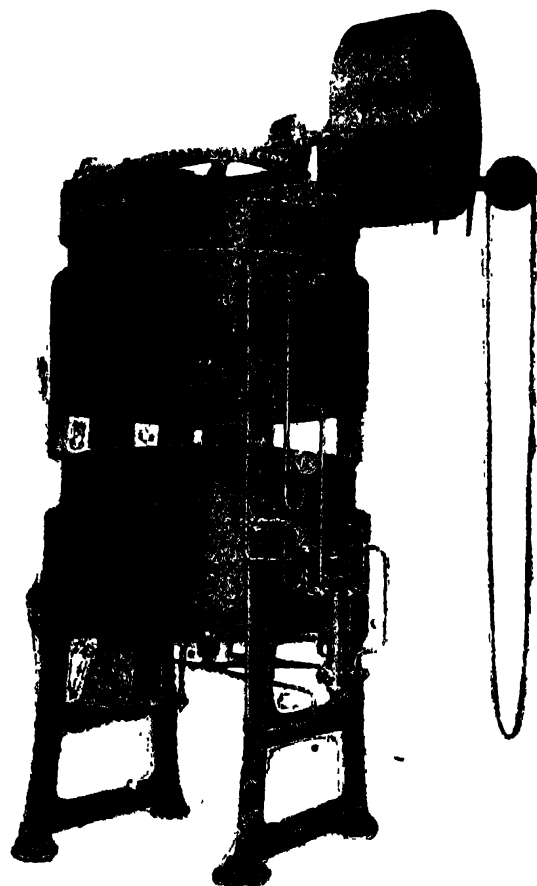


Fig. 2. Double Steam Kettle.

PREPARATORY MACHINES.

As different kinds of machines are required for different materials we proceed to describe them briefly.

COPRA.

The copra as received at the oil mill is in the form of lumps of considerable size. These have to be reduced to the form of "meal" by various shreadings and grindings. Sometimes however the material is found to contain an odd assortment of scrap iron which are removed by the magnetic separator. The subsequent reduction of copra to the form of meal for the press is effected by means of rolls after being broken.

The breaking machine, inside a casing, contains a power-driven segmental worm having a coarse pitch at the feed end and a finer pitch at the delivery end. At the latter end there is fitted a hardened perforated steel plate through which the partially broken copra is forced by the worm. A four-bladed knife revolves against the worm side of this plate and cuts the copra as it passes through the perforations besides assisting its passage through these holes.

The rolls are of chilled cast iron and are hydraulically pressed on to steel shafts. One roll in each pair runs in fixed bearings, the other running in sliding bearings which are acted upon by relief springs disposed within circular boxes on the frame sides. The force of these springs is adjustable to give the required degree of pressure between the rolls.

LINSEED, ETC.

Linseed, rape seed, and similar small seeds require very little special

preparation for pressing. Beyond screening to remove foreign matter such seeds have only to be crushed between rolls to convert them to meal suitable for pressing.

A screening machine consists of a cast iron casing containing a slowly rotating cylindrical screen into the interior of which the seed is delivered. Inside the screen is a fast-moving paddle which throws the seed against the interior surface of the screen.

COTTON SEED.

Cotton seeds for the purpose of oil milling may be classified into those the husk of which is practically free from adhering cotton fibre and the other to which quite a considerable quantity of cotton fibre may be adherent. It pays the oil-mills to re-gin or de-lint it as a preliminary to treating it in the rolls and presses. A cotton seed delinting machine as employed at an oil mill is almost identical with a cotton gin as employed by the cotton grower.

In some cases it will be found advantageous to remove the husks or cortex of the cotton seeds before crushing and pressing them. In this way the kernels, or "meats" as they are called, alone are pressed. A decorticating machine for cotton seeds consists of a rotating barrel carrying ten knives crosswise on its periphery, and of a fixed "breast" carrying three stationary knives similarly disposed crosswise. The seed is fed on to the barrel from an overhead hopper by means of a power-driven fluted feed roll working in conjunction with a hand-regulated shutter across the hopper mouth. The

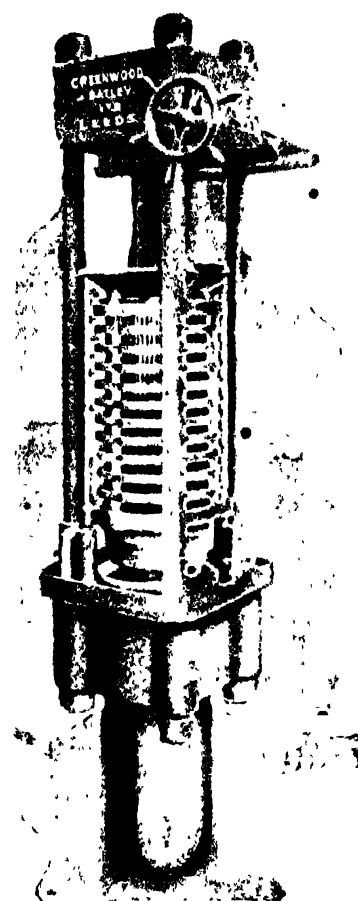


Fig. 3. Hydraulic Press.

"breast" is made in four sections, the divisions being coincident with the planes of the central lines of the three "breast" knives. The seed falling on to the rotating barrel is caught between the rotating and fixed knives. The husks and kernels together are carried round to the lower edge of the "breast" and are there collected.

CASTOR SEED.

The distinguishing feature of castor seed as an oil-bearing substance lies in the fact that the portion which carries the oil is enclosed within two outer casings. The first step in the preparation of the seed for pressing is the removal of the outer shell or pod.

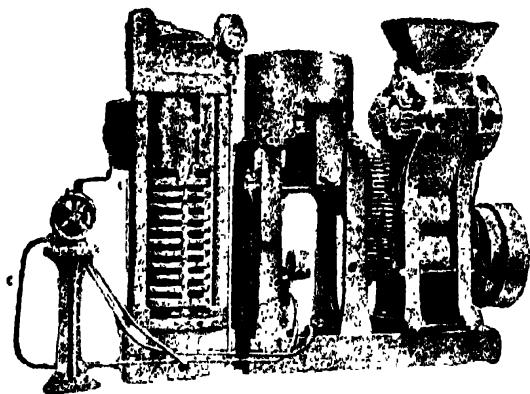


Fig. 4. Complete Oil Mill with Press.

In a combined decorticator and separator for castor seed the beans are distributed from a hopper, provided with a fluted feed roll and a hand-regulated shutter plate. The beans fall and are cracked between a pair of cylindrical rolls, the space between which can be suitably regulated by hand. Leaving the rolls, the broken shells and kernels fall on to a shaking separator. This separator consists of two series of contra-sloping trays, extending between and united to a pair of vertical side frames. The frames referred to are hung by means of eight flat steel springs from the main framing of the machine, four of the springs being within the main frames, and four, at a lower level, being external to them. The separator is vibrated by means of a pair of flexible connecting rods lying outside the main frames, and coupled up to a short-throw crank shaft extending across the main frames as the right-hand end. An air trunk with a fan at its foot is arranged between the main frames at the crank shaft end. This trunk has four separate orifices, the blasts from which can be controlled independently by shutters operated by

racks and hand-wheels. The shells and kernels falling from the rolls travel under the shaking action from one tray to the next in the series. The kernels complete the whole course and are carried off over the left-hand end of one or other of the trays into a vertical passage, from the foot of which they are eventually discharged. Doors are provided in the outer wall of this passage to regulate the egress of the air blast.

MEAL KETTLES.

Whatever be the original form of the material it is delivered from the preparatory machinery in the form of "meal". When the oil is to be expressed hot, as is usually the case, the meal has to be heated at the next stage. The heating of the meal is commonly conducted in a steam "kettle" and is, of course, carried out immediately before the pressing takes place, so that the material when placed in the press may still be hot.

The heating of the meal greatly facilitates the expression of the oil from it, for it results in the rupturing of the minute vessels or sacs in which the oil is naturally contained within the meal. The heating proper of the meal is effected usually by means of a steam jacket surrounding the kettle.

The meal is withdrawn from the kettle in convenient amounts, and is immediately rough-moulded in a machine into rectangular or other shaped slabs or cakes of a size suitable for the press in use. As quickly as made these cakes are taken to the press, so that they may be pressed before they lose their heat.

A typical meal-heating kettle is a cylindrical iron vessel jacketed round its side and bottom for heating steam at a pressure of about 75 lbs. and containing power-driven stirring gear. The steam jacket round the side is covered with a layer of non-conducting material, enclosed within a sheet metal casing. The top of the kettle is open, except for the cast iron bridge which spans it and carries the driving gear. The bottom of the kettle with its steam jacket is made readily detachable from the rest for renewal purposes, as this part is that which is most subjected to wear. The thorough agitation of the meal in the kettle is necessary, not only to attain uniform heating, but also to prevent its becoming discoloured.

RECEIVING PANS.

When the meal is to be pressed cold a heating kettle is, of course, not required. It is convenient, however, to provide a "receiving pan" for the meal, from which the moulding machines may draw their supply. The kettle itself acts as such a receiving pan when hot pressing is being followed, and with the steam shut off from the jackets may still so serve when cold pressing is adopted.

MEAL-MOULDING MACHINES.

The object of the moulding machines is to press the meal into the form of a cake, so as to facilitate the filling of the main presses. The moulding pressure employed must not exceed that at which oil will commence to flow from the meal. The moulding machine must be reliable and quick in its action. As each cake is formed in it, the cake

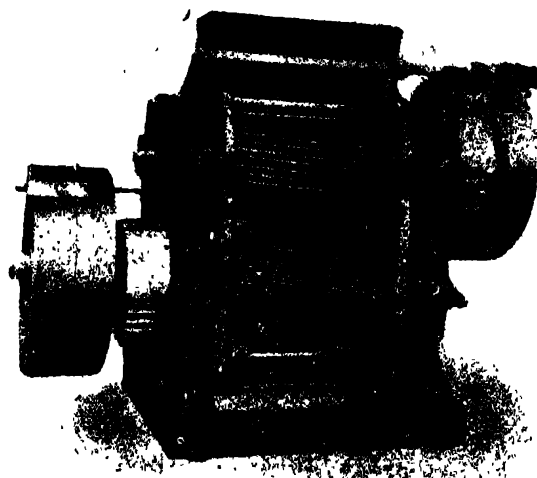


Fig. 5. Copra Breaking Rollers.

is taken away to the press and a succeeding cake moulded.

There are various forms of moulding machines in the market. A hydraulic moulding machine of the usual type is described below. It is generally arranged close beside the kettle so that the strickling box filled with meal may be readily drawn over on to it. The strickling box leaving the supporting board of the kettle passes on to the hard wood frame being guided thereon by the upstanding edges of the block. The block is counterbalanced and is hinged to turn upwards and backwards. Before the strickling box is pulled across, the wood block is lifted up and a tray of sheet steel is placed on top of the sliding table. Over this tray is placed a length of "press bagging," a woven material. The wood block is then lowered back on to the sliding table and the strickling box run out so as to fill the hole in the block with meal. On hinging back the wood block, a gauged amount of meal is thus left standing on the tray and press bagging. The bagging is of the same width as the cake

to be formed, and of about twice the length. The two ends are folded over the top of the meal, and the sliding table, with the tray, bagging and meal, is pushed forward over the hydraulic ram. The sliding table supports the tray round three of its edges. When the tray is pushed over, it moves a lever operating the valve of the hydraulic ram, so causing the head of the latter to raise against the underside of the tray, lift it off the table, and compress the meal against the fixed head of the machine. The table meanwhile is withdrawn and made ready for moulding a second cake. The ram is lowered by operating the valve lever by hand, and the cake and bagging supported on the tray are removed to the presses. The pressure employed in the hydraulic cylinder is from 500 lbs. to 600 lbs. per sq. inch.

PRESS BAGGING.

The "press bagging" alluded to above is generally made of wool and commonly obtainable in different widths. It is not simply a wrapping for the cake. It fulfils in reality a most important function, for without its presence the yield of oil from the meal would be considerably reduced.

HYDRAULIC PRESS.

The modern hydraulic oil press consists of a cast iron head and bottom, united by four forged steel columns having buttress-threaded nuts at each end, a cast steel cylinder resting within the bottom casting, and a hollow cast-iron ram supporting a cast-iron table or head. The bottom casting is flanged all round to form a tray in which the

expressed oil is caught. Between the top and bottom castings fifteen steel press plates are arranged horizontally. These plates provide spaces for sixteen cakes, each space, when the plates are fully dropped, being $2\frac{1}{8}$ in. in depth. Each plate is hung from the one above by means of four oval mild steel links slipped over square-headed studs screwed into the plate edges, the topmost plate of all being hung similarly from the top casting. To the inner side of each of the four columns of the press a flat, square-edged runner or guide is pinned. The width of the guides is a loose fit between these guides while square-headed studs, screwed into the plate edges, engage outer faces of the guides, and prevent the plates moving lengthwise. This method of supporting the plates secures the required condition, namely, that the plates, when pressed upwards, should close together without friction, or at least without cumulative frictional resistance. The corrugations on the press plates as well as the longitudinal ridges which are raised on the plate, are intended, as far as possible to prevent the meal from spreading when the pressure is applied.

THE CAGE TYPE OIL PRESS.

The cage type of press is made in many forms, the more common of which is described below. The cage press is provided with a cast iron head, four forged-steel columns with buttress threads, a cast-steel cylinder and a cast-iron ram. The bottom of the press is formed solidly with the cylinder, and is therefore of cast steel. A circular cast-iron oil tray, provided on its underside

with four horses through which the columns pass, rests on top of the cylinder casting. The ram rises through a gland at the centre of this tray. Just above the tray four split muffs are bolted round the columns to provide stops whereon the cage in its lowest position may rest.

THE WORKING OF A CAGE PRESS.

This press is arranged about half above and half below the working floor level, and a heating kettle is placed close beside it. When the cage is resting on its bottom stops the top surface of its upper casting is level with the surface of the plate, hung beneath the kettle on which the strickling box slides. With the movable press head run back out of the way the strickling box with a charge of meal can thus be pulled over to discharge its contents into the cage. Before this is done, however, a circular steel plate is dropped into the mouth of the cage so that it may come to rest, a short distance down, on four catches projecting through the walls of the top casting of the cage. A circular sheet of press bagging is placed on top of the plate. Thereafter the meal is strickled in a layer into the cage mouth. The plate catches are mounted on a ring so that they may be withdrawn simultaneously to allow the plate, bagging, and layer of meal to drop down on to the head of the ram. The fall allowed is not great, however, for the ram to begin with is run up almost to the top of the cage and as the loading proceeds is allowed to descend slowly to keep pace with the formation of the layers of meal.

When the cage is fully charged the movable head is run back over it. The end of the head is turned to a good fit with the bore of the cage. Just before pressure is applied to the meal by the ram, pressure is admitted to two auxiliary ram cylinders which, acting beneath the lower casting of the cage, lift the cage a short distance upward so as to cause its mouth to pass on to the cylindrical head and so close the joint. Pressure is then admitted to the main cylinder. As the expression of the oil proceeds the cakes of meal become bound tightly against the walls of the cage. When, the cakes have stood for a sufficient length of time under pressure, the main ram is set to exhaust until the cage is lowered on to the bottom stops. The auxiliary hydraulic cylinders are arranged to act as buffers for the cage so as to bring it quietly to rest. The movable press head is then run out.

The cakes produced in a press of this type are reduced again to meal which, after being heated, is expressed a second time.

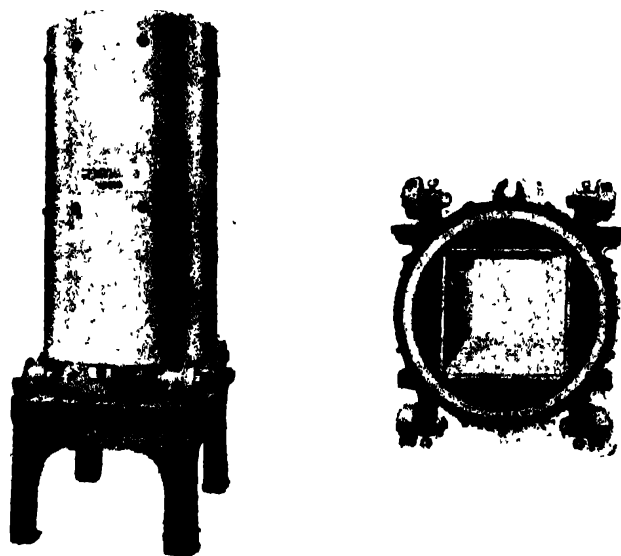
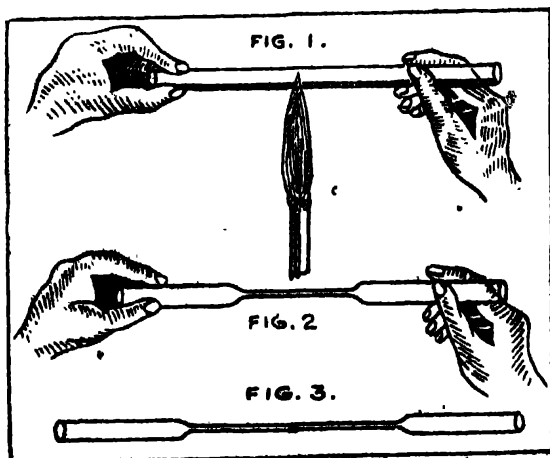


Fig. 6. Pressing Cage and view from bottom.

THE ART OF GLASS BLOWING—II.

SEALING TUBES.

The procedure to be adopted for sealing glass tubes depends upon the purpose for which they are required. For example in making test tubes take a piece of $\frac{1}{2}$ in. tube 10 ins. long, hold it in the large blow-pipe flame so that the centre only is heated, and gently rotate (Fig. 1). When the glass has become thoroughly pasty, remove from the flame and withdraw the hands from each other with a slight twisting motion (Fig. 2). Be careful to keep the capillary tube concentric as far as possible. Now with the small flame heat the tube at A (Fig. 3), and, when melted, draw away the capillary portion. Lay aside the half of the tube having the fine part attached, and proceed with the other portion. Heat it in the large flame until the end becomes somewhat rounded with a small knob of glass adhering, and at once proceed to remove the projection. Lower the flame, and play upon the knob only (Fig 4). Bring a glass rod against it and draw away some of



the glass. Continue this treatment until the knob has entirely or almost entirely disappeared. Turn up the flame again, heat the whole end of the tube, remove from the flame, place the open end in the mouth, and blow gently, at the same time rotating the tube, so as to obtain a neat rounded end. The second portion of the tube may be treated in the same manner. As a precaution against cracking, though this is not necessary with good glass, hold the end in the smoky flame until covered with soot, and then rest it against a block of wood. Hot glass should on no account be placed upon a metal or other cold surface.

A few hints on blowing will be relevant here. In order to blow out a neat bottom to the tube it is necessary to hold the tube horizontally or nearly so. The end of the tube should be placed loosely in the mouth, not touched with the teeth and not gripped in any way by the lips. The lips should only touch it sufficiently to make an air-tight seal. The blowing should be very steady, slight at first while the glass is hot, but gradually increasing as the glass cools. If the blowing be too strong at first, the bottom of the tube will swell but into a bubble and burst. During the blowing the tube should be rotated slowly backward and forward, the fingers, of course, never leaving the tube. This last point is essential to good glass blowing.

WORKING GLASS ROD.

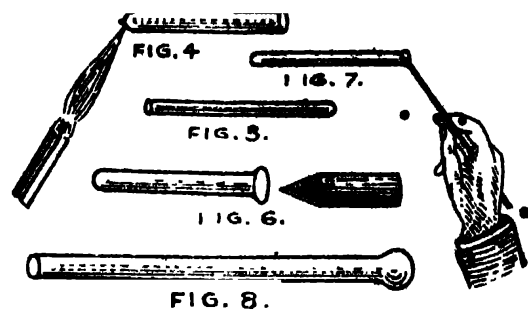
In order to work glass rod it must be heated more carefully than glass

tube, because it is thicker; otherwise, it will fly to pieces. Therefore, in heating up a glass rod, always hold it for a few seconds in the hot air from the blowpipe, and gradually bring it into the flame. The thicker the glass rod, the more carefully must this preliminary heating be carried out.

Stirrers will furnish work for practice. Cut off several lengths of the rod, the most convenient sizes being 4 in., 6 in., and 8 in. Hold each end of these in the hot air of the blowpipe, and bring gradually into the flame; in a very short time the ends will become nicely rounded. They may then be laid down with the hot ends resting against a block of wood or off the edge of the bench. Annealing will not be necessary unless the rods are thick (Fig. 5).

THE MOUTH OF A TUBE.

The mouth of a tube may be finished by the following process. Take up one of tubes, and hold it in the full flame of the blowpipe in a slanting position, so that the mouth only is heated. Allow the glass to fall in slightly, then remove from the flame. Take up a charcoal cone, place it in the mouth of the tube, and give one or two turns so as to force out the mouth to a slight extent. This will give a finish to the tube and at the same time, add strength to the open end. (Fig. 6) The opening out of tubes in this manner can be more neatly carried out with the triangular tool, but it is better to practise first with the charcoal cones. Tubes under $\frac{1}{2}$ in. diameter may be treated in the same way, using however, a piece of stiff iron wire instead of the cone. The iron wire must be held



at a slight angle with the mouth of the tube, and the latter rotated against it. (Fig. 7).

• BLOWING SMALL BULBS.

Take a piece of tubing about 8 in. long and $3\frac{1}{16}$ in. diameter, and hold one end of it in the large blowpipe flame, the tube sloping upwards away from you, so that the end is highly heated. The tube soon closes up, and a lump of pasty glass collects upon the closed end. As soon as this is the case, withdraw the tube from the flame, hold it in a horizontal position, blow into the open end, rotating it all the time and observing the precaution not to grip the tube at all, until a small spherical bulb about $\frac{1}{2}$ in. diameter is obtained (Fig. 8).

All truly wise thoughts have been thought already thousand of times, but to make them truly ours we must think them over again honestly, till they take root in our personal experience.

There are four things a businessman ought to know—himself, his business, how to use his means and knowledge, and the other fellow.

Capital is the starting lever of the industrial machine; labour the motive power driving it to a profitable destination.

MAKING BILLIARD BALLS.

BILLIARD-PLAYING is an indoor game of absorbing interest. Though it is found as a necessary adjunct in European hotels and club houses it has now-a-days penetrated the Indian parlours also. The manufacture of billiard balls will therefore be a paying industry.

The making of ivory billiard balls is an art which though comparatively simple, demands the exercise of very great care and skill. In the first place, the ivory from which the balls are to be made must be carefully selected as all tusks are not suitable for making billiard balls. The tusk for this purpose should be as nearly as possible of the same diameter as the ball is to be, and its core should correspond as nearly as possible with its axis. The necessity for this will be readily understood when the structure of ivory is considered. The elephant's tooth grows by the deposition of the fibres in layers round a central axis. The ivory is denser, and therefore heavier, the nearer it is to this axis. This centre of density is not as a rule concentric with the section of a tooth. So that if a ball be made from such a tooth its heaviest part, instead of being in the centre, will be nearer to one side and therefore the ball will have bias on that side, and will be defective.

After selecting a suitable tusk, the balls are roughed out and then left to season for two or three years before being turned to the correct size and shape. The seasoning is a most important process. Ivory shrinks on ex-

posure to the atmosphere, owing to the gradual evaporation of the moisture it contains. Moreover, the shrinkage is in one direction only so that the shape of a billiard ball made from unseasoned ivory would not in course of time, remain round.

In spite of all possible care taken in its manufacture a ball will not always remain perfectly true. The continual concussion causes the cells of the ivory to close up and the ball to get out of precision. By taking off a shaving of ivory, the spherical shape of the balls can be restored, but it will then become smaller than the standard size.

Billiard balls are made in different sizes: the diameter varies from $2\frac{1}{16}$ to $2\frac{1}{4}$ or $2\frac{1}{2}$ ins. The process of manufacture is briefly described below. A block of ivory is placed in a chuck and turned roughly to the size and shape required. The ball is turned one half at a time, and the rings that are taken are made into bangles. The balls are now hung up in a net to dry; they have to be kept free from draughts, otherwise they are in danger of cracking. When thoroughly seasoned they are turned by expert workmen, and in this operation the greatest skill and precision are required. It is a good plan to leave the balls after the second turning about $1\frac{1}{16}$ in. larger than the size required, and allow it a further period for seasoning before the final turning, which is to produce the perfect sphere and the exact size. Each ball must be perfectly accurate in weight as well as in size; the standard weight of a set of balls is 14 oz.

The balls are polished with simple whiting and water applied on linen rag several times folded. They are sometimes glasspapered before being polished, in order to obliterate any traces of the tool which might show through the polishing, but if this is done at all it must be only to a very limited extent, or it will tend to destroy the truth of the sphere. Even in the final process of polishing, care has to be taken not to give the ball the very slightest bias by excessive rubbing in one direction; the position of the ball must be frequently changed so that the abrasion in polishing may cross it in all directions.

The method of dyeing the red balls is to first thoroughly clean them by immersing for three or four minutes in a weak solution of nitric acid and then in clean cold water that has been boiled. The stain is made by boiling red cloth and adding sulphuric acid in the proportion of about one part of acid to sixty of the stain. The stain is raised to a temperature of about 100° F., and the balls are immersed in it for from two to three hours. In order to ensure extreme cleanliness, the balls must not be touched with the fingers during the staining process; a pair of wooden tongs is used instead.

REINFORCED CONCRETE.

IT has been found from experience that concrete alone is not able to hold up any appreciable tensile load on account of its low tensile and shearing strengths. The tensile strength of concrete varies from one-eighth to one-tenth of its compressive strength, and as this is apt to be entirely lost by a sudden jolt, it is customary to neglect it entirely in all engineering calculations.

Hence to secure the necessary tensile and shearing strengths, steel rods or strips (whose tensile and shearing strengths are much greater than that of concrete) are embedded in concrete sufficiently to utilise to the best advantage the characteristic properties of each material. A combination as such is termed in engineering as Reinforced Concrete. This is called also Armoured concrete and Ferro-concrete.

The factors which facilitate such a combination are (i) the ease with which steel can be embedded in concrete; (ii) the practical equality of the expansion co-efficients, and hence acting together of the two materials under changes of temperature; (iii) the strong adhesion between concrete and steel; and (iv) the practicability of supplementing this adhesion by lugs or other lateral projections from the surface of the steel. While concrete tends to protect the metal, so embedded, from fire, heat and corrosion, the metal holds itself sufficient (i) to take up all the tensile stresses; (ii) to assist in the resistance to shear; and (iii) to assist in the resistance to compression where necessary. It should be noted that concrete is the only material visible in structural members of reinforced concrete.

For the manufacture of reinforced concrete the concrete should be in accordance with specifications enumerated by me in my article on "Cement Concrete" (which appeared in the issues of February and March 1925 of this journal,) and the metal reinforcement should be of steel complying with British standard specifications for structural steel for general building construction and must possess a tensile breaking strength of 28 to 33 tons per square inch. The steel is commonly used in the form of round or square bars set apart at prescribed dis-

tances in concrete, and connected by means of hangers, stirrups, or shear members as they are variously called.

Special regard is paid to the distribution of steel in concrete and consequently a good deal of necessary calculations are made for reinforced concrete design, based upon certain theories which have gradually been built up as our knowledge of the action of the composite material has progressed. Particular care is taken with regard to the distribution of stresses to which concrete offers little or no practical resistance. In view of this, various theories have been devised for designing of various structural members. I need not go into the details of such theories in practice at present, but it will be sufficient to mention that each country, nay each engineer holds his own theory which he has been able to frame up from his vast practical experience in the field.

The chief advantages claimed for reinforced concrete construction are, that when it can be appropriately employed, it combines the merits of stonework and of steel-frame construction, and possesses far greater strength than ordinary concrete. For equal strength reinforced concrete walls may be much thinner than those of masonry—a valuable space-saving advantage; and the embedded steel, for equal strength with steel frame sections, is much smaller in quantity and is effectually protected from rust and from the contorting effects of great heat.

Both steel and concrete are more portable than stone blocks and steel girders, and in the process of construction are much more accommodating, the concrete being plastic, and the reinforcement easily bent. Reinforced concrete is fire-resisting. It is also impermeable to water. Moreover experience has shown that a reinforced concrete building being monolithic—that is, all in one piece—has no element that like bricks or stone-blocks, would be shaken loose

by the vibration of heavy machinery or even by earthquake shocks.

Reinforced concrete is the most adaptable of building materials, and has been lately adopted for every class of structure. Hitherto it has been chiefly employed in the tension-sustaining portions of beams and girders, (including floor-slabs), columns, stairs, dams, retaining walls, warehouses, balconies, docks, harbours, reservoirs, light-houses, water-works, bridges of limited span etc., etc. It has also been used in many other cases; as for preventing hair-cracks in surfaces, for which purpose a light web of metal (wire mesh, expanded metal, etc.) is placed a few inches back from the face; for preventing fracture due to unavoidable sudden changes in cross-section; for joining walls meeting at an angle and liable to settle away from each other; and in culverts, enabling them to withstand horizontal tension due to the outward pressure of the embankment. For this purpose old chains may be used, or light rails, with bolts driven through the bolt holes, to increase adhesion. A common objection to the use of concrete is that it presents a dull face. Hence many buildings constructed of reinforced concrete have been faced with stone to improve their appearance.

The theoretical economy of reinforced concrete is indicated by the fact that for equal duty the cost of concrete in compression is only about three-fifths that of the steel, and that for equal duty the cost of steel intension is barely one-sixth that of concrete. The practical economic advantage of reinforced concrete varies with the relative dimensions of the compression and tension areas, and the proportions of steel employed. Apart from any question of cost, however, reinforced concrete, on account of its fire-resisting and non-corroding properties reduces insurance premiums, obviates the need for fire-casing, and reduces the maintenance charges to a minimum.

—By Mr. R. K. MIRCHANDANI.

GRAFTING IN HORTICULTURE.

INTRODUCTION.

ONE of the most common methods for the propagation of plants is by grafting as grafts are much sought after by persons interested in gardening.

A graft is a shoot taken from a plant whose good qualities it is desired to perpetuate, or one which for various reasons is not altogether a success on its own roots. The graft, or scion, will subsequently become the leafy, flowering, and fruitful portion of the plant, growing upon the stem and roots of another, but nearly related, subject.

Grafting is the process of inserting a piece of plant, usually a bud or twig, in another so that it will grow. Grafting is employed to propagate varieties

of fruits, nuts, etc., that do not come true from seed; to change over orchards, already established, into more desirable sorts; to dwarf plants; to grow tender sorts on hardy roots, or in adverse soils, etc. It is a necessary practice with nearly all orchard fruits, most nuts and with many ornamental shrubs, etc. The plant on which the grafting is done is termed the stock, and the part inserted into the stock is called the scion, though by scion is usually understood a twig consisting of one or more buds rather than detached buds. The essential principle in grafting is to bring the cambium layer (growing tissue between the bark and body) of the scion and stock in close contact with each other and to keep them there until they grow together.

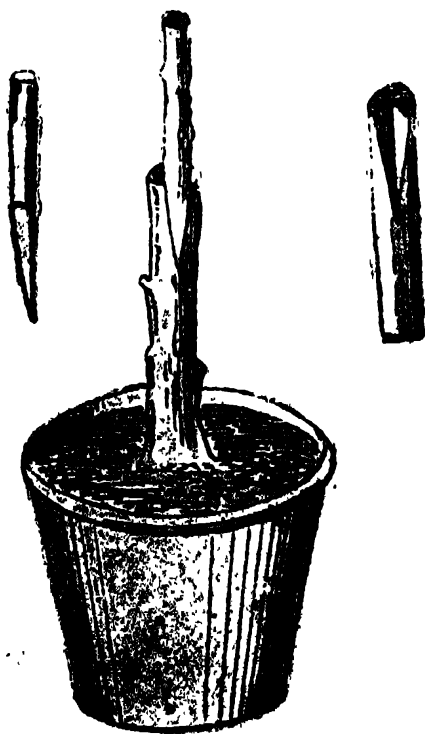
DIFFERENT METHODS.

There are innumerable methods of grafting classified as follows:—

- (1) Budding.
- (2) Wedge.
- (3) Cleft.
- (4) Notch.
- (5) Saddle.
- (6) Crown or rind.
- (7) Tongue or whip.
- (8) Grafting by approach.

PRELIMINARY OPERATIONS.

The actual time of carrying out the work is governed by the locality and the season. Suffice it to say that the time for grafting is opportune when buds of trees are seen to be swelling freely. Preparations for grafting must



• Fig. 1. Wedge Grafting.

be made some time beforehand, as with most subjects it is inadvisable to head back the stock when the movement of sap is becoming active. At this period cut back to within a short distance of the point at which union is to be made. The grafts or scions should be of the previous seasons wood, well furnished with growth buds. Success in grafting largely depends on having the sap moving freely in the stock while that of the graft (scion) is dormant at the moment of insertion. Among the gardening implements may be mentioned the pruning saw, knives, tying material, wooden mallet, chisel; and a hard wood wedge. These should be prepared ready for use while the knives used should be very sharp, so that the wounds may be clear.

FORMING A UNION.

The crucial point in the actual operation is to ensure the union of the cambium layer, or ring of growing tissues, of both stock and scion. A union on one side is absolutely essen-

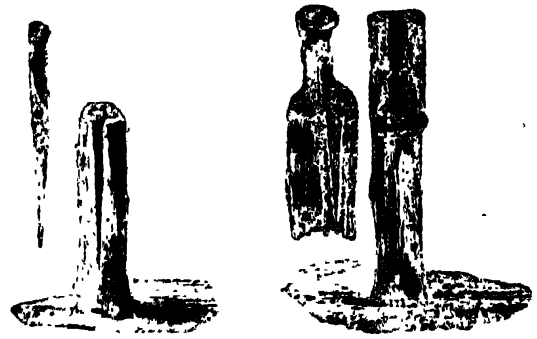


Fig. 2. Cleft Grafting.

tial. This having been effected, the tying and claying, or waxing, remain. The clay should be in a very pliable state, so as to be thoroughly worked all over and round the union, for the complete exclusion of air. In the use of wax the material is painted on with a brush, a thin coating being sufficient. In either case should cracks appear they should be promptly filled, so that air may not reach the junction until the union is complete.

BUDDING.

Budding is practised with peaches, cherries, plums and most stone fruits. It consists in inserting a single bud under the bark of the stock. It is

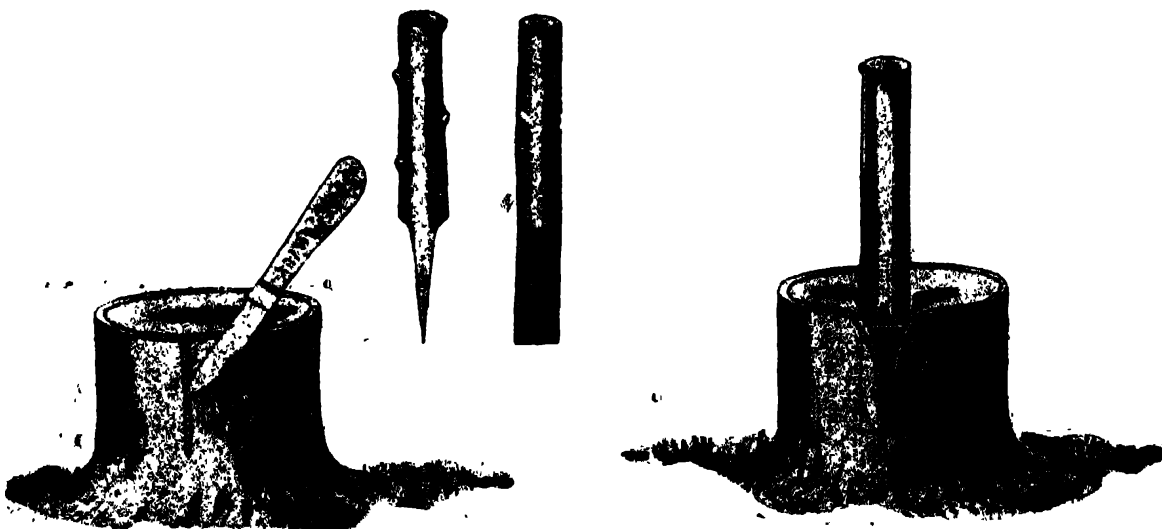


Fig. 3. Crown Grafting.



Fig 4. Tongue Graft by Approach.

practised more specially with small stocks 1 or 2 years old. Older trees are scion grafted or the larger limbs are cut back and the sprouts allowed to grow for a year and these then tended. One-year-old nursery trees are bended 2 to 3 inches above the ground. A T-like cut is made through the bark of the stock, the bark is then slightly lifted near the top of the cut and a little piece of bark containing the bud, is inserted and pressed down so that it is held firmly in place. The bud is then tied firmly in place, with the tying material. No wax or covering material is used.

The stock is prepared for budding by stripping away the lower leaves and twigs from the area to be budded. The bud should be cut from the twig with a sharp thin-bladed knife. Only the bark is required, but just underneath the bud the operator should cut a little into the wood. Small buds will be found in the axils of the leaves. These leaves should be reserved at once, leaving only a small part of the stem as a handle. Special care is re-

quired that the buds do not dry out. They should be left on the twig or bud stick, as it is called, until wanted for use. The buds usually "take" in 2 or 3 weeks.

WEDGE.

For wedge grafting stock and scion should be about of one size. The graft is cut so as to form a long wedge at the basal end, and a piece to correspond is cut from the stock. Putting in position, tying and claying, follow.

CLEFT.

The old stocks are split across with the chisel; the part is held open with the hard wood wedge; the scions are sliced down and inserted. They must be carefully placed in position, and the wedge removed. Care must be taken to ensure the union of the inner barks. The tying and waxing are the same as in saddle grafting.



Fig. 5. Whip Grafting.

NOTCH.

A wedge-shaped piece is cut out of the stock, and the scion is cut to fit. Particular care must be taken to secure equal cuts or it will be found impossible to effect a proper union.

which is inserted and made firm in the ordinary way.

TONGUE OR WHIP.

For working young stocks this is the most useful method. The tops should be removed from the stocks in

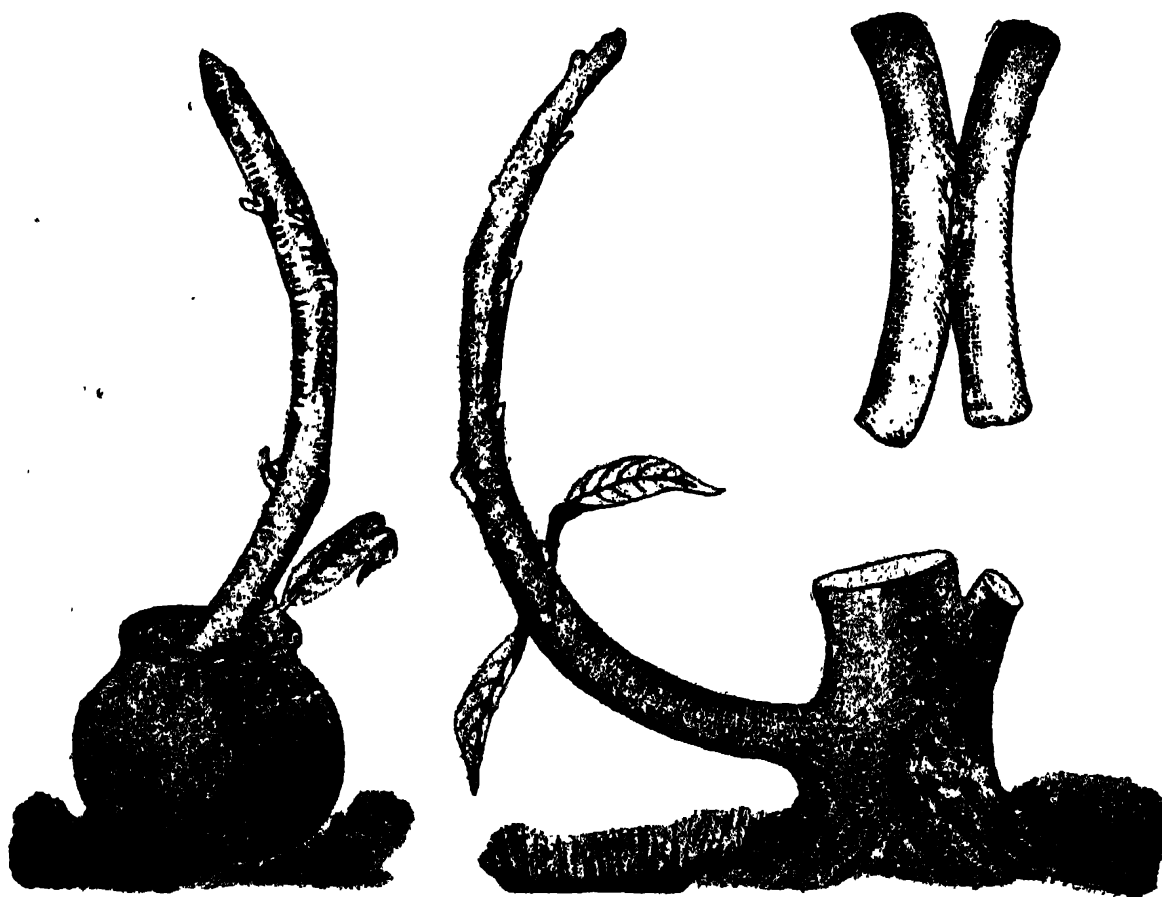


Fig. 6. Inarching.

SADDLE.

The stock is cut to form a wedge, and a wedge-shaped piece is taken out of the scion, thus exactly reversing the processes of wedge grafting.

CROWN OR RIND.

The scion is cut the same as in the initial stage of whip grafting, but the bark at the upper part is larger. A slip is cut down the bark and forms a cavity for the reception of the scion,

a row, then the scion prepared by making a long, slanting cut, which removes the basal portion and leaves fine buds. Next make an upward cut in the stock to correspond with that on the scion. Make a slanting cut downwards and inwards in the stock and then with a second cut take out a very small wedge. On the scion make two corresponding cuts, measuring to make sure that the size of the stock is re-

produced in the scion. Trim carefully if necessary to favour a perfect fit. The scion should then be inserted, making absolutely certain of a union of the inner bark on at least one side, and tie in very firmly. The binding should commence in the middle, pass downwards, and then upwards to finish at the top. Waxing, claying can then be done, and the work will be complete. The number of buds retained on the graft should not exceed four, and if the graft be weak, two or three will be better. This method is usually employed for filling of blanks in trained trees.

GRAFTING BY APPROACH.

In grafting by approach or inarching two branches are brought together and united detaching either branch from the parent plant. This is accomplished by making suitable wounds in the branches and bringing them together so that the cambium layer of one will come into intimate contact with the cambium layer of the other. The branches are then bound together at the point of contact and waxed. When the scion has united with the stock it is cut off below the union and the top of the stock removed.

GRAFTING CLAY AND WAX.

Grafting clay is used where a quantity of grafts have to be inserted upon the stumps of old trees that have been headed down. The disadvantage lies in the liability to cracking, which must be watched for and guarded against. It is commonly made up with adhesive loam and fresh cow manure in about equal portions, the whole being worked until they are thoroughly

incorporated. If preferred, horse droppings rubbed through a sieve, or chopped hay, may be added. The material should have the consistency of soft soap.

The wax used for covering over the wound is made by melting together beeswax, tallow and resin and a very good formula for outdoor use is made of 1 pound tallow, 2 pounds beeswax and 4 pounds of resin. The melted mixture should be poured in a pail of water and pulled with greased hands until it becomes light-coloured and grains. It may then be put away in oiled paper and will keep indefinitely. The warmth of the hands will be sufficient to soften it for use in the orchard. The hands must be greased to prevent it from sticking to them. The wounds should be covered air-tight with the wax.

Encouragement is one of the best lubricants for the human machine.

It is not sufficient to be awake, but you must also be alive.

Promptness in decision and firmness of purpose are required to take a man to the top.

When writing an advertisement you must of course, consider the character of the goods you have to describe, but be sure also to consider the character of the people you are trying to get as customers.

The courage of silence is often greater than the courage of speech. It requires heroism of a high order to hold one's tongue when, by so doing, one is tested by the shallow as a coward.

HULWA OR INDIAN PORRIDGE.

(By a Practical Expert.)

INTRODUCTION.

HULWA which may be described as

Indian porridge is a kind of sweet-meat familiar in every part of India. As is to be expected there are different varieties of it the most common being that made from *suji* or *semolina* while the bases of others are meal of pulses, paste of almond or pulp of fruits. The chief ingredients entering into its composition are (1) a starch basis, (2) ghee, (3) sugar, (4) spices, etc.

The usual mode of procedure is broadly outlined. The ghee is taken in a pan and melted over a moderate oven. The ghee is ready when the everescence ceases. The spices, if any, are singed in it, and then the basis is well cooked. The frying is complete when the mass becomes slightly brownish and when a pleasant aroma emanates from it. A quantity of water is now poured in sufficient to boil the mass: any deficiency will leave the product raw while an excess will make it insipid. When ebullition occurs the sugar is added and the mass is agitated. Finally the remaining ingredients are incorporated and the stuff removed when it becomes pasty. The perfumes are added after removal and immediately covered up. The whole operation will take from three quarters to an hour.

It is essential that the heat should be moderate throughout as the *Hulwa* is best cooked in slow oven. The mass in the pan is also to be constantly

agitated particularly towards the beginning and the end as otherwise a part might stick at the bottom and get burnt.

Great care is to be taken throughout the cooking operation otherwise everything will be spoilt. The proportion of the ingredients may be judiciously adapted to suit individual tastes.

As the quality of the product will naturally depend upon the raw material employed only fresh things must be chosen. Of utensils an iron pan will generally do but when fruit juices are employed it should be of enamel or aluminium. The frying of pulse is considered perfect only if its characteristic odour cannot be recognised after the *hulwa* is completed. When almond and pistachio are used as basis they are ground to a paste but when strewn over they are cut into fine chips. When properly prepared *hulwas* are not only dainty but also nutritious and as such they furnish palatable and at the same time substantial tiffin.

The ingredients mentioned in the recipes are more or less commonly known. We shall explain only the rare articles. 16 as equal 1 tola.

Suji, or *semolina*, obtained in flour milling, is of two kinds, coarse and fine. *Khoa* kheer is dried milk, *Paneephal* or *singhara* is water chestnut. When it fully develops it yields a starch on being dried in the sun and ground. *Chiranji* is a kind of indigenous almond. *Jalgujia* is the well-known elongated nut in hard but brittle shells sweet to taste and rich in oil.

RECIPES.

(1)

Suji	1 sr.
Ghee	1 sr.
Sugar	1 sr.

Melt the ghee on a pan over fire. When the ghee is ready, pour the suji into it and stir vigorously so that it does not stick to the bottom and get burnt. Then add water and boil for some time. Stir constantly otherwise the mass will clod. When ebullition occurs add sugar and stir again. Remove when cooked.

(2)

Suji	1 sr.
Ghee	1 sr.
Sugar	1½ sr.
Almond paste	½ poa.
Saffron	2 as.
Milk	1 poa.
Nutmeg	2 as.
Cardamom minor	1 "
Aniseed	1 "

Dissolve almond paste and saffron in milk in a cup. Melt the ghee on a pan over fire and when ready fry the suji, stir until it becomes a little brownish in appearance. Then pour the milk and add water in sufficient quantity. Stir constantly and add sugar when ebullition occurs. Remove when the mass becomes solid and mix in the spices in powdered form.

(3)

Coarse suji	1 sr.
Ghee	1 sr.
Sugar	1½ sr.
Dry dates	½ sr.
Almond paste	1 poa.
Pistachio	½ poa.

Khoa kheer	1 poa.
Saffron	2 as.
Cardamom minor	½ tola.
Saffron	2 as.
Cassia leaves	8

Melt the ghee in a pan over a fire, and when ready singe the cassia leaves and saffron. Pour in the suji and stir constantly until browned. Then add water, stir until ebullition occurs. Mix in the sugar and incorporate the remaining ingredients in paste form. Stir with a spatula and remove when thick. Finally add cardamom powder and a little camphor.

(4)

Gram meal	3 poa.
Ghee	3 poa.
Sugar	3 poa.
Saffron	1 a

Melt the ghee on a pan and when ready add the gram meal; stir continuously until it becomes brownish. Add water and when ebullition occurs add sugar. Stir well and remove when the mass thickens.

(5)

Moong pulse meal	2 srs.
Ghee	2 srs.
Sugar	2 srs.

First melt the ghee on a pan and when ready add the moong meal. Stir until well fried and add water. Add sugar when ebullition occurs. Stir well and remove when the mass thickens.

(6)

Matar pulse meal	1½ sr.
Ghee	1½ sr.
Sugar	1½ sr.
Dry dates	1 poa.
Cardamom Major	4

First melt the ghee and when ready fry the matar meal. Then pour water and stir continuously; when ebullition occurs add the dates and the sugar. Incorporate thoroughly and add cardamom after removal.

(7)

Green peas	$\frac{1}{2}$ sr.
Ghee	$\frac{1}{2}$ sr.
Sugar	$2\frac{1}{2}$ poa.
Pistachio	1 ch.
Cardamom	2 as.
Saffron	1 a.
Camphor	1 rati.

First bray the peas to a paste, not finely but rather coarse. Then melt the ghee on a pan and singe the saffron. Fry the pea paste in this ghee and stir well. Add water and boil. When ebullition occurs add sugar and after a while add the pistachio in fine chips. Remove when the mass thickens and then add cardamom powdered and camphor.

(8)

Cow pea meal	$\frac{1}{2}$ sr.
Ghee	$2\frac{1}{2}$ poa.
Sugar	$2\frac{1}{2}$ poa.
Raisins	1 ch.
Raisins large	1 ch.
Pistachio	1 ch.
Saffron	1 a.
Cardamom Minor	1 a.

First melt the ghee on a pan and when ready singe cardamom seeds and saffron in it. Next cook the meal of cow peas in it until it becomes a little brownish. Then pour in water and when ebullition occurs add gradually sugar, raisins, etc. Remove when pasty.

(9)

Almond	1 sr.
Ghee	$\frac{1}{2}$ sr.
Cassia leaves	4
Cardamom seeds	4
Saffron	2 as.
Sugar	$\frac{1}{2}$ sr.
Raisins	$\frac{1}{2}$ poa.
Milk	$\frac{1}{2}$ sr.
Camphor	1 rati.

Bray the almonds to a paste after skinning them; then melt the ghee on a pan and singe the spices in it. Cook the almond paste in this treated ghee until brownish and boil in milk and water. When ebullition occurs add the raisins and after a while sugar. Sprinkle the camphor after removing and cover up.

(10)

Raisins	$2\frac{1}{2}$ srs.
Ghee	3 poa.
Sugar	1 sr.
Pistachio	1 ch.
Almond	$\frac{1}{2}$ poa.
Cardamom seeds	1 tola.

The raisins are first freed from dirt and washed in water. Melt the ghee in a pan and cook the raisins in it. Then pour in water and allow to boil. Add pistachio chips and almond paste. Incorporate cardamom seeds in powder form after removal.

(11)

Pistachio	1 sr.
Ghee	$1\frac{1}{2}$ poa.
Cassia leaves	8 pieces.
Saffron	1 a.
Rose water	qs.

First bray the pistachio to a paste. Melt the ghee in a pan and

singe in it cassia leaves and saffron. Cook the pistachio paste in this and boil in water. After ebullition occurs add the sugar and stir well. Remove when the mass becomes thick and perfume with rose water.

(12)

Almond	1	sr.
Pistachio	$\frac{1}{2}$	poa.
Raisins	1	poa.
Khoa kheer	1	poa.
Aniseed	1	tola.
Cardamom seed	2	as.
Cloves	2	as.
Cinnamon	2	as.
Saffron	1	a.
Cassia leaves	4	pieces.
Ghee	$\frac{1}{2}$	sr.
Sugar	3	poa.

Melt the ghee on a pan and singe in it cassia leaves and saffron. Cook the almond and pistachio paste in this ghee together with powdered kheer. Mix together thoroughly and pour in water: scrape the bottom of the pan from time to time otherwise everything will be spoilt. When the mass thickens strew the aniseed and add the sugar. Sprinkle the spices after removal from fire and cover up.

(13)

Pistachio	$\frac{1}{2}$	poa.
Almond	$\frac{1}{2}$	sr.
Raisins	1	poa.
Kheer	1	poa.
Saffron	1	a.
Sugar	$\frac{1}{2}$	sr.
Ghee	$\frac{1}{2}$	sr.
Dry date	$\frac{1}{2}$	poa.

Almond and pistachio are brayed to a paste and the dry dates ground to a

pulp. Mix together the pulp and the paste. Melt the ghee in a pan and singe in it saffron. Cook the above mass in it until well fried and boil in sufficient water. Add the sugar when ebullition occurs and remove when the mass thickens. Sprinkle rose water and cover up.

(14)

Suji	$\frac{1}{2}$	sr.
Ghee	$\frac{1}{2}$	sr.
Sugar	$\frac{1}{2}$	sr.
Pistachio	$\frac{1}{2}$	ch.
Saffron	1	a.
Orange juice	$\frac{1}{2}$	sr.

Melt the ghee in a pan and singe the saffron in it. Then cook the suji and stir well. Pour in the orange juice with some water and allow to boil. Add sugar when ebullition occurs. Sprinkle the pistachio pieces and cover up.

(15)

Green Gram	1	sr.
Ghee	1	sr.
Sugar	1	sr.
Almond	1	ch.
Cardamom Minor	1	tola.

Bray the gram to a paste after skinning. Melt the ghee in a pan and cook the paste in it. Pour the water and allow to boil. When ebullition occurs add the sugar and strew over the almond chips when the mass thickens. Remove, add cardamom and cover up.

(16)

Dry dates	1	sr.
Ghee	$\frac{1}{2}$	sr.
Sugar	3	poa.
Almond	$\frac{1}{2}$	poa.

Pistachio	1	ch.
Cassia leaves	5	pieces.
Saffron	1	a.

First reject the seeds of the dates and soak in water. Take them out when soft and ground to a pulp. Next melt the ghee in a pan and singe in it cassia leaves and saffron. Cook the date pulp in this ghee and boil in water. When ebullition occurs add sugar and when the mass thickens strew over the almond and pistachio chips. Remove and when cooked sprinkle over camphor and powdered cardamom minor seeds.

(17)

Musoori pulse	1½	sr.
Ghee	1½	sr.
Sugar	1½	sr.
Almond	1½	poa.
Dry dates	½	poa.
Raisins	½	poa.
Grape juice	1	poa.
Saffron	1	a.
Cloves	1	a.
Cardamom Minor seeds	1	a.
Cinnamon	½	sr.
Milk	½	sr.

The musoori pulse must be in the form of meal. Melt the ghee in a pan and singe in it the spices. Then cook the pulse meal in it and when thoroughly cooked pour in the milk and then water. When ebullition occurs add gradually the grape juice, dry dates and raisins. When the mass thickens add sugar and strew over the almond in fine chips. Remove and when cold sprinkle camphor and perfume with 8 or 10 drops of rose otto.

(18)

Paniphal meal	1	sr.
Ghee	1	sr.
Sugar	1	sr.
Chiranji	1	poa.
Saffron	1	a.
Cassia leaves	4	pieces.

First clean the chiranji and wash them in water. Melt the ghee in a pan and singe in it cassia leaves and saffron. Cook the *paniphal* meal in it and stir constantly. Pour in water and boil. When ebullition occurs add sugar and then the chiranji. Finally strew over aniseed in powder after removal.

(19)

Jalgujia	½	sr.
Moong suji	1	sr.
Ghee	1	sr.
Khoa kheer	1	poa.
Saffron	1	a.

First melt the ghee and singe saffron in it. Cook the moong meal in it and pour in water. When it begins to boil incorporate the *Jalgujia* and *Khoa kheer*. Add the sugar and remove when ready.

(20)

Sweet Potato	1	sr.
Ghee	1	sr.
Sugar	½	sr.
Almond	½	poa.

First scrape off the skin of the potatoes, and cut them into pieces. Dry them in the sun until stiff and grind the crisp pieces into coarse powder. Next melt ghee in a pan and cook the potato meal in it. When fried properly add an adequate quantity of water and when ebullition occurs add sugar and almond chips.

(21)

Coarse Suji	1½	sr.
Ghee	1½	sr.
Sugar	1½	sr.
Apple juice	3	poa.
Almond paste	½	poa.
Cassia leaves	5	pieces.
Saffron	2	as.

First core the apples, cut them into pieces, pound and press the juice. Next melt the ghee in a pan, singe the spices in it and cook the suji. Now pour in water and boil. When ebullition occurs stir in apple juice and almond paste. When the mass thickens add sugar and agitate. Remove when the mass thickens.

(22)

Mango juice	½	sr.
Mung meal	1	sr.
Ghee	¾	sr.
Sugar	½	sr.
Khoa kheer	1	poa.
Raisins	½	poa.
Almonds	½	poa.
Pistachio	1	ch.
Cassia leaves	2	pieces.
Saffron	2	as.
Cardamom Seeds	1	a.

Melt the ghee in a pan and singe the cassia leaves and saffron in it. Fry the moong meal in it and pour in water when cooked. When ebullition occurs stir the mango juice and raisins and after a while add the sugar. In-

corporate the almond and pistachio chips and strew over powdered cardamom seeds. Sprinkle a bit of camphor after removal and cover up.

(23)

Gram meal	1	sr.
Ghee	1	sr.
Sugar	3	poa.
Jalgujia	1	poa.
Khoa kheer	1	ch.
Date juice	1	sr.

Melt the ghee in a pan and singe the cassia leaves. Then cook the meal in this and pour in water. When ebullition occurs incorporate the Jalgujia brayed to a paste and the powdered Khoa kheer. After a while add the sugar and remove when the mass thickens. Sprinkle a bit of camphor and cover up.

(24)

Cow pea meal	1	sr.
Ghee	1	sr.
Sugar	½	sr.
Jack-fruit juice	½	sr.
Milk	1	sr.
Almond paste	½	poa.
Raisins	1	ch.
Cardamom seeds	1	a.

First mix the fruit juice in milk and keep it handy. Melt the ghee in a pan and fry the meal in it. Pour in the milk-juice mixture together with water and when ebullition occurs add the raisins. Incorporate almond paste and sugar and remove when it thickens. Strew over powdered cardamom seeds.

OUR DISTRICT POSSIBILITIES.

CAWNPORE.

The district of Cawnpore occupies the North Western corner of the Allahabad division, and belongs to the tract known as the lower Doab, this comprising the eastern extremity of the strip of country lying between the Ganges and Jumna river. The soils found in the district exhibit a great variety of composition and appearance but on the whole they differ little from those found through the middle and lower Doab. The drainage of the district is generally good. A striking feature of the district is the proportion, enormous as compared with that of many parts of the United Provinces of waste and barren land.

The mineral products of Cawnpore are limited to those which occur throughout the Gangetic plain. Timber for building purposes is to be obtained locally. The rivers and tanks contain a plentiful supply of fish.

AGRICULTURE.

The extent of cultivation and the agricultural capabilities of the tract cannot be fully ascertained. About 900000 acres are under cultivation. That a further extension of tillage is possible has been proved by experience.

The methods of husbandry and the implements in general use in the district present no peculiar features being in vogue for centuries. The cultivator divides the agricultural year into the usual three seasons, and calls the harvests by the three usual names of *kharif*, *rabi* and *zaid*, or intermediate. With a few and unimportant exceptions

the produce of the rabi harvest consists of wheat, barley and grain, sown either alone or, as is more generally the case, in combination. The kharif crop statement is more diversified, and the local distribution considerably more varied. Generally speaking, the bulk of the harvest consists in the large millets and cotton sown in combination with the pulse known as *arhar*, a growing amount of maize and a small area of rice, while a noticeable feature is the unimportant position held by sugar cane. Under existing conditions the district is on the whole admirably provided with means of irrigation.

INDUSTRIES.

While Cawnpore is the greatest manufacturing centre in India outside the presidency towns its development is due almost wholly to European enterprise and initiative. The indigenous manufactures are relatively insignificant and present no features of special interest. The most extensive is that of country cloth, which is still woven in considerable quantities throughout the district, though the industry has suffered much from the competition of factory made goods. Cotton-printing is to be found in a few places such as Musanagar but is now unimportant. Vessels of brass and other metals are made at Cawnpore, some of the suburban villages and a few other places, but the metal trade is concerned mainly with articles from Mirzapur and elsewhere. A certain amount of cheap cutlery is made at Cawnpore, chiefly in imitation of important goods. The pottery of the district presents no peculiar features and the same may be said of the manufac-

ture of glass, almost solely in the form of bangles, which is carried on to some extent in the northern tahsils where it is abundant. Cotton ginning and pressing, tanning and shoe making, and cotton or wool weaving, etc., are being gradually taken up by Indians.

The industry which first made Cawnpore famous was that connected with the tanning and curing of leather and the production of articles made therefrom. The Government Harness and Saddlery Factory is now an immense concern. The work also contains a brass and iron foundry and smithy for the production of all metal work. The North West Tannery Co., Ltd., is a flourishing concern doing a large business in all manner of leather goods, particularly in saddlery, harness, bags, trunks and the like. The first great cotton mill to be started in Cawnpore was the Elgin Mills. Tent making is a very important industry in Cawnpore and is carried on by many small manufacturers as well as by the larger concerns. The Cawnpore Woollen Mills produce woollen fabrics of all descriptions, the wool being obtained mainly from the Punjab and Tibet, while a certain amount is imported from Australia. Cotton pressing and ginning are important industries in Cawnpore and there are many firms engaged in the business.

A firm very closely connected with many of the industrial enterprises of Cawnpore is that of Begg, Sutherland & Co. In addition to their business as seed and produce merchants they are

interested in many other undertakings. They are managing agents of Cawnpore Sugar Works, Brush factory, etc. Among other industrial enterprises mention must be made of the Empire Engineering Co. Ltd., and others.

TRADE.

Besides the city of Cawnpore there are no markets of any great importance in the district. Taken as a whole the district enjoys exceptional advantages as regards means of communication, and is now covered with a net work of roads and railway focussing on Cawnpore.

The imports consist chiefly of grain, spices, salt, cotton, timber metal, dyes piece-goods, etc. The exports consist of cotton, foodstuffs, dyes, spices, leather etc.

Every man takes care that his neighbour shall not cheat him. But a day comes when he begins to care that he does not cheat his neighbour then all goes well. He has changed his market cart into a chariot of the sun.

When you feel yourself becoming disarranged or a periodical slump, remember that even the brightest day may suffer a temporary eclipse of the sun.

If we had no faults we should not take so much pleasure in noticing the faults of other people.

Your brain is like a failing cabinet. You have to put things in both, but its what you take out that counts.

It is all right to put something aside for a rainy day, but don't be so busy doing it that you deprive yourself of the time to enjoy a list of sunshine.

IDEAS FOR SMALL CAPITALISTS.

MULBERRY SILK INDUSTRY.

(Continued from Feb. issue.)

Mr. E. Lakkaraju Naidu, Chemo House, Malancha Road, Kharagpur sends us the following:—

BREEDING.

EVERY wise agriculturist reserves some portion of his previous year's harvest as seed for the ensuing year; likewise professional silk rearsers cannot always purchase eggs. But they have to rear their own eggs though it is not so easy as rearing of the worms; yet when once the business gets a footing and if organised on an improved and large scale, rearing of eggs also can be undertaken. To the ordinary rearer and to the general readers therefore this article will be of interest. The difficulty does not lie in rearing of eggs, but in selecting disease-free and best eggs.

The finest and largest compact cocoons are selected for reproduction purposes. The moths begin to emerge from early morning on the 10th or 11th day after spinning, then the male and female moths pair. Good-sized well-feathered and active moths are selected for egg production. The largest living moths are the strongest and should be preferred* in the selection of the best seed. Each couple is placed under small tin funnels in a dark room for six or seven hours. The pair is separated, destroying the male ones and the female moths are isolated under tin funnels on a sheet of paper on which almost immediately they commence to deposit eggs. A

healthy moth lay 300 to 400 eggs and the eggs of the first eight or nine hours are the best. The best eggs are laid uniformly and not one upon another; the space between them is little and uniform. All good eggs stick to the paper. If the male moths are less or greater than the female ones, they are made to pair with 2 or 3 female moths and in the latter case they are kept for next day's use.

For selecting disease-free eggs the following articles are required. (1) A microscope of 500 to 600 magnifying power. (2.) Slides. (3.) Caustic Potash 5 per cent. solution to dissolve the fat bodies so that pebrine spores can be detected easily. After the fifth day of oviposition the abdominax of a female moth is crushed, adding few drops of the solution. The juice is kept on the slide and examined under the microscope. If found to contain only fatty globules the eggs are put in a 2 per cent. solution of copper sulphate for half-a-minute and then in shade for about quarter of an hour. They are washed well for half a minute in clean water and then spread on a paper for drying in shade in a dry, well-ventilated place. The eggs of multivoltine races will hatch on the 10th to 15th day after deposition and that of univoltine races after about 6 to 10 months. For uniform and regular hatching it is essential that the eggs of the one-brooded race be sent to some cold place either a hill station or a refrigerator where the temperature varies from 35 deg. to 45 deg. F

for at least five or six months. Eggs can be sent safely by post and they can be preserved in Kashmir, Shillong, Simla and similar towns.

DISEASES.

Silk worms are attacked by various diseases and the more common out of them are pebrine, grasserie, flacherie and muscardine. If disease-free eggs are obtained for rearing and if seeds or eggs are exchanged from time to time there is little possibility of disease and a good harvest is yielded. There are no curative measures for these diseases but only preventive measures such as disinfection of breeding appliances etc. should be adopted against disease breaking out.

PEBRINE is a hereditary disease of silkworms caused by the parasitic growth of a minute spherical organism and is caused by general uncleanness, unhealthy feeding and the use of eggs from pebrinized moths. When examined if the juice of the body of the moth is found to contain pebrine corpuscles the eggs laid by the moth must be discarded. This disease is highly contagious and is also called 'Spot Disease' as minute black spots are visible to the naked eye on the skin of the worms. The affected eggs hatch and moult late, wither and die in the worm stage if the disease is acute, but if the worms are mildly attacked they mature late. The worms can be attacked with this disease in all stages of their growth.

FLACHERIE is caused by indigestion. Crowded trays, dewy, dusty, muddy, too old or fermented leaves and excess of heat also bring in this disease. The worms attacked with this are unable to

digest their food, become lean and thin, sometimes they vomit a green juice from their mouths, pass semi-liquid faeces and die. The disease is contagious and appears more in summer than in other seasons.

GRASSERIE is caused by juicy and tender leaves fed to old worms. The body of the diseased worm swells up, becomes cloudy and thick; crawls around the tray and does not eat its food. Worms attacked with grasserie and muscardine generally die in the cocoons so these two diseases are not found when examining.

MUSCARDINE which is a fungus disease is caused by excess of moisture and heat and appears during the rains. The diseased worm feels soft and flabby to the touch and then dies. After 4 or 5 hours the dead body becomes very hard and stiff, turns white and appears like a piece of lime.

WASHING.

For dyeing purposes the raw or reeled silk has to be washed and the amount of the gum to be removed depends on the nature of the dye and also of silk. The silk is soaked in cold water for half-an hour and boiled in soap solution at 200 to 204 F for an hour keeping the silk in a gunny or coarse cotton bag which prevents scowing spots on the silk as the bubbles in the boiling soap solution cannot come in direct contact with the silk. Now the silk is ungummed and is ready for dyeing deep or dark shades. For light shades the silk is boiled for 2½ to 3 hours as it has to lose about 25-30 per cent. of its weight and washed thoroughly. The soap solu-

tion or liquor as it is called is prepared by making marseilles or oleine soap 10 to 15 per cent. of the weight of raw silk with 60 to 70 times its weight of water for the former and soap 1-5 the weight of the silk and crystal soda 2 per cent. of the silk's weight for the latter case. Raw silk should never be washed in soda or lime water as is practised by many dyers as the strength of the silk is weakened thereby.

DYEING.

Dyeing in itself is a paying industry and can be even taken up as a separate occupation with a very small capital. Dyeing is a business, and can be hardly learnt from formulas. Dyeing of silk differs from that of cotton and the following is the full practical process of different kinds to their best extent. The colours that are used for silk dyeing are many and out of them those that are in common use are (i) Vegetable colours, (ii) Acid colours, (iii) Alizarine colours, (iv) Basic colours.

Vegetable Dyes:—Before the importation of cheap aniline dyes, the vegetable dye manufacture was a land mark of India. These colours are extremely fast, but dull in appearance; they are not so bright and glossy as the other synthetic dyes mentioned: hence they are unfortunately becoming unfashionable now. Extracts of Turmeric (*haldi*), Annatto (*palas*), Catechu (*kath*), Madder (*manjistu*), Safflower (*kusum*), Jackwood (*kanthal*), Indigo (*neel*) and Lac give tolerably fast colours. Many of the vegetable dyes have been put out of use and only a few are still holding out.

To lac dye put washed or boiled-off silk in saturated solution of alum. Boil it for half-an-hour and leave all night to cool and absorb the mordant. Mordant is a substance in which the silk is first soaked which when combined with the dye produces the colour required. Next morning wash the silk gently in cold water. Boil one chattack of crude lac in half seer of water for half an hour and strain on cooling. Put the mordanted silk in the extract, heat to boiling and continue boiling for $2\frac{1}{2}$ hours. Wash well in cold water. Brighten with 3 per cent. Acetic Acid, wring out and dry in the shade.

Acid Colours:—There are many acid dyes that are suitable for colouring silk and a few out of them are the following.

Azo Coccine 2 R; Columbia Yellow. Water Blue; Indocyanine B.

Columbia Violet R; Mikado Orange 4 R. O.

Columbia Fast Scarlet 4 B; Curcumin Extra.

Salmon Red; Sorbine Red G.

Brilliant Congo R. G. Thiazine Brown G. R.

Cyprus Green B; Diamond Green B. D.

Erica B. N.; Diamond Green G.

Azo Acid Yellow; Naphthol Red S. G. Acid Yellow G. R.; Alizarine 40 per cent.

Silk Black 4 B. F.; Brilliant Orange.

Silk Blue B.; Janus Black.

These colours are used in a bath of boiled-off soap liquor or in its absence solution of Glauber's Salt 5 per cent. The quantity of liquor should be about

1/5th or 1/6th the amount of water in the bath and the water about 50 to 60 times the weight of silk.

Alizarine Dyes:—Alizarine dyes have no affinity for silk but mordanted silk when dipped in the alizarine dye give the required colour. Always one brand of alizarine (say 40 per cent. purity) should be used and the different colours are obtained by mordanting the silk with different mordants. Recipes and directions are enclosed with these dyes.

Basic Dyes:—They are generally used for topping other dyes as they are not fast. The silk is first dyed with an acid or alizarine dye and then dipped in a basic dye to change or brighten the colour. Likewise alizarine dyes are often topped with acid colours.

Processes of dyeing are omitted here, for in an article of this stamp more cannot be written for want of space.

WEAVING.

Ordinary silk weaving differs in no way from the weaving of other textile fabrics. The following tools and materials are required for silk weaving.

(1) Some bamboo *cherkies* on which the skeins of raw silk are put for reeling of the thread on to *latais*.

(2) Some bamboo *latais* for unwinding the skein.

(3) Some pegs or posts, *kathies* or rods for placing in the ground for warping. Charki and *kulki* or *khuri* are also necessary for the purpose.

(4) Charka for filling or changing spools and bobbins.

(5) Sizing materials such as extract of *khai* or fried rice, arrowroot and extract of tamarind seed. Boil any of these until thoroughly cooked. Then strain the liquid and use for sizing.

(6) Loom complete with reeds, healds, yarnbeam, clothbeam, bamboo rods, treadles, heald suspenders, shuttle, spoon, etc.

(7) Brushes, Katanis for stretching the warp, pots, etc.

If the same loom is used for weaving both silk and cotton cloth, different reeds and healds are required as the thread in silk weaving is fine. Dyeing

and weaving can never be learnt theoretically but one must at least have six months' practice. For further information on this section you may write to the Government Weaving Institute, Serampore.

CONCLUSION.

The decline in the silk industry in India has been attributed to the following causes:—

- (i) Inferior breeds of worms.
- (ii) Disease.
- (iii) Defective reeling.
- (iv) Use of substitute for silk.
- (v) Lack of proper training.
- (vi) Want of organisation.
- (vii) Extension of the industry in Japan and other countries.
- (viii) Importation of cheap artificial silk.

Further the industry has suffered being a home industry practised by a large number of scattered people and not in any way an organised one. Other factors are absence of organised co-operation of the workers and their want of capital.

The silk industry is essentially a domestic industry employing men, women and children. From start to finish no great effort requires to be made. One of the economical steps of India is for people to wear home-made cloths, so the time is very opportune. Khaddar being coarse and heavy is disagreeable to many, silk textiles will be acceptable being smooth, fine and light albeit satisfying the conditions of home-spun and hand-woven, in every respect. True the price of a silk piece is much higher than that of cotton one, but the former lasts for as much as 5 to 10 times.

Mulberry silk is not the whole subject of the silk industry in India but is one section of the two important and distinct divisions into which it is divided, viz., the domesticated mulberry feeding and the wild or non-mulberry feeding worms. The first section yields Mulberry silk and of the latter Tasar, Eri and Muga which are of commercial value.

SMALL TRADES AND RECIPES.

Cement For Floors.

Substantial earthen floors for country bungalows may be made as follows. Take two thirds of lime and one of coal ashes, well sifted, with a small quantity of loam clay, mix the whole together, and temper it well with water, making it up into a heap; let it lie a week or ten days, and then temper it over again. After this heat it up for three or four days, and repeat the tempering very high, till it becomes smooth, yielding, tough, and gluey. The ground being then levelled, lay the floor therewith about two and a half or three inches thick baking it smooth with a trawal; the hotter the season is the better; and when it is thoroughly dried it will make the best of cheap floor. If it is desired to make the floor look better, take lime of rag stones, well tempered with white of eggs, covering the floor about half an inch thick with it, before the under-flooring is too dry. If this be well done, and thoroughly dried, it will look, when rubbed with a little oil, as transparent as metal or glass.

Confectionery Drops.

Take a quantity of double refined sugar, pound it and sift it through a hair sieve, not too fine; and then sift it through a gauze sieve, to take out all the fine dust which would destroy the beauty of the drop. Put the sugar into a clean pan, and moisten it with any favourite aromatic; if rose water pour it in slowly, stirring it with a paddle, which the sugar will fall from—as soon as it is moist enough, without sticking. Colour it with a small quantity of liquid carmine or any other colour, ground fine. Take a small pan with a lid, fill it three parts with paste, place it on a small stove, the half hole being of the

size of the pan, and stir the sugar with a little ivory or bone handle, until it becomes liquid. When it almost boils, take it from the fire and continue to stir it; if it be too moist take a little of the powdered sugar, and add a spoonful to the paste, and stir it till it is of such a consistence as to run without too much extension. Have a tin plate, very clean and smooth; take the little pan in the left hand, and hold in the right a bit of iron, copper, or silver wire four inches long to take off the drop from the lip of the pan, and let it fall regularly on the tin plate; two hours afterwards take off the drops with the blade of a knife.

Composition for Covering Building.

Take the hardest and purest limestone free from sand clay, or other matter; calcine it in a reverberatory furnace, pulverize and pass it through a sieve. One part by weight, is to be mixed with two parts of clay well baked and similarly pulverized, conducting the whole operation with great care. This forms the first powder. The second is to be made of one part of calcined and pulverized gypsum, to which is added two parts of clay, baked and pulverized. These two powders are to be combined and intimately incorporated, so as to form a perfect mixture. When it is to be used mix it with about a fourth part of its weight of water, added gradually stirring the mass well the whole time until it forms a thick paste, in which state it is to be spread like mortar upon the desired surface. It becomes in time as hard stone, allows no moisture to penetrate and is not cracked by heat. When well prepared it will last any length of time. When in its plastic or soft state, it may be coloured of any desired tint.

INDIA'S INDUSTRIAL PROGRESS.

Industries of Burma.

The Government of Burma in the Ministry of Industries appointed a Committee to consider how far the recommendations of the Indian Industrial Commission regarding the grant of financial assistance by Government to industries should be adopted in Burma. The Industrial Finance Committee, Burma, at the outset of its report draws a distinction between "Major industries." and "Cottage industries." As regards major industries, the Local Government agrees with the recommendation of the Committee that, although those connected directly or indirectly with agriculture would probably have first claim on financial aid, other selected industries might suitably be supported if a reasonable scheme for their development were put forward.

Of the major industries examined in more detail by the Committee, the salt industry is reviewed at some length. Stress is laid in the report on the potentialities of Burma for the development of white sugar manufacture. The remaining major industries reviewed by the Committee are pottery, the manufacture of rubber articles, cotton spinning, cotton and silk weaving and glass making. None of these has as yet been developed on a factory basis to any important extent though some of them provide employment as "Cottage indus-

tries" to a considerable number of people. The last Chapter of the Report deals with cottage industries regarding which the Committee observes that the present policy of Government appears to be suitable. The expansion of cottage industries depends largely as observed in the Committee's Report, on improved organization for marketing combined with standardization of products and the Superintendent of Cottage Industries will be directed to pay special attention to these problems.

Calico Prints in Bombay.

As a result of the hand-dyeing and calico printing experiments carried on by the Industries Department for two years continuously two firms in Ahmedabad and one in Surat have taken up the manufacture of calico prints on the improved methods. There is a distant opening for this work in the presidency, as a possible outlet for Bombay products can be found in their use by the people of East Africa. Samples of the hand printed cloths imported into East Africa from Manchester and Holland have been secured through the Indian Trade Commissioner to East Africa. These are generally 46 inches wide and 66 inches long, and known as Khangas. They are supplied in various styles. Attempts are being made to interest Indian firms and Bombay mills which do machine printing in this trade.

Manganese Ore in India.

In the pre-war days Manganese ores were largely supplied by Russia and India. During the last few years, however, fresh sources have been discovered in Brazil, the Gold Coast of Africa, and a few other places. But in spite of the competition of the new fields there is little doubt, asserts INDUSTRIAL INDIA, that the manganese industry in the two first named countries will continue to develop as the demand for manganese increases. The Indian fields have proved most useful and it is reported that the prospects for the future are very good. The Indian ore on account of its hard lump form, is much more suitable for blast furnace than the more friable ores obtained from the Caucasus, and it is also possible, owing to the better selection, to export a more uniform quality than that which characterises the Russian shipments. The ore consists mainly of psilomelane with an important amount of brannite. The quality of the manganese varies in different fields in this country, but on the whole the quality is considered high. The ores of the Vizagapatam district are mainly psilomelane with small amount of pyrolusite and brannite. The typical ores of the Central Provinces consist of mixtures of brannites and psilomelane; the ores in Mysore are usually associated with banded ferruginous quartzites. The ores from the Central Provinces are considered of the highest grade, while those from Vizagapatam and Mysore belong mainly to the second and third grades. The first grade ores have a high manganese content usually from 49 to 54 per cent, and a moderately high iron, from 4 to 8 per cent. The silica varies 6 to 9 per cent, and the phosphorus about 0.07 to 0.14 per cent. The second and third grades are characterised by high iron and phosphorus contents and comparatively low silica.

At present practically all the ore mined in India is shipped to Europe and America for conversion, only a few thousand tons being used in India, and this chiefly as a desulphuriser in iron and steel furnaces. With the development of the iron and steel industry in India doubtless a larger demand will be made on the supplies, but for many years to come India will need to seek its markets in the West. Unfortunately the high percentage of phosphorus in the Indian ore makes the supply not so satisfactory for Indian ore as supplies from other parts. But with the improvements in the iron trade the necessary adjustments would probably be easily made.

Firozabad Glass Industry.

The Town of Firozabad, in the district of Agra, is noted for its glass manufactures of all kinds, and, for the last quarter of a century, has served as the chief market for the supply of bulk glass of different colours, especially fancy bangles of beautiful patterns for all parts of India. In all seasons of the year, but more particularly in the cold weather, it is the resort of glass traders from the Punjab, Rajputana, Gujarat, Sindh, Bengal, Madras, and the Deccan; and in fact from all parts of the country. There are at present about 50 factories that turn out plain and fancy bangles from crude glass supplied by the Local Glass Works, and the Indian Glass Works, established in 1903, has also succeeded in manufacturing ruby, lavender and amber coloured glass, that hitherto had to be imported from abroad. It is under contemplation to extend the business by applying modern approved methods and introducing European machinery, when glass articles locally manufactured will successfully compete with imported manufactures both in regard to quality and prices.

SCIENTIFIC AND INDUSTRIAL TOPICS.

Grafting Cotton Plant.

The need for increasing the world's cotton crop has set men thinking and experimenting and a remarkable attempt to improve the output by grafting the cotton plant on the root of the mulberry tree has proved apparently successful. A single cotton plant of a kind that normally yield forty bolls or pods, produced 900 bolls when grafted on to the mulberry root. This plan was the idea of a plant breeder in Southern States of America and his experiments are being watched with the greatest interest, for if the success can be maintained, not only will the crop be enormously increased, but the cost of cultivation will be much reduced. Some of the grafted cotton plants have grown eight feet high.

Testing Precious Stones.

With increased facilities for faking diamonds and other precious stones, the traffic in imitation goods in this line of business is increasing to an alarming extent, and diamond merchants and jewelers nowadays have perforce to devote a lot of time, and often expense, to the detection of the frauds.

When once a jeweller suspects the genuineness of a stone, he subjects it to various and sometimes very severe tests. When a stone, for instance, is placed in clear water, and starts to lose its bril-

liance, it is immediately discarded as being spurious. Another test is to place a drop of water on the gem. If the globule breaks on being touched with the point of a pencil, the stone is an imitation.

Sometimes a black dot is made on a piece of white paper, and the precious stone held in front of it. If the dot appears blurred, the diamond is faked.

Another determining factor is the hardness of a stone. As is well-known a diamond is one of the hardest known substances, and may be filed without being scratched. An imitation diamond, on the other hand, will crack and probably break up under the weight of the file.

Curiosities Of Hair.

Some curious anomalies regarding the hair and skin have been noted by a Professor. He tells us that hair is merely skin which has grown in a particular way, hardened, and instead of being rubbed away, as happens with the ordinary surface of the skin, sticks out in tubular form. The pigment which colours the hair is not the same as that which colours the skin, for the skin of an Anglo Saxon, however black his beard, is not negroid.

Experiments with a prebald cat showed that though at first glance the

skin, shaved of hair, remained part-coloured as the hair, when the places were put under a microscope it revealed that the coloured parts were merely the hair roots seen under the skin.

Melanin is the name given to the pigment which colours Negroes or the black cat, and this pigment will also be found when an apple or potato is cut in half and exposed to the air. It is not clear, however, what relation exists between the colouring matter of differently hued animals.

In studying white animals some interesting points arise. There are two sorts of white animals, as in the case of white rabbits (pure white with pigmented eyes) and albinos (which are devoid of pigment or colouring matter.) If one were to cross a pure white rabbit with a pure black, the family in the first generation would all be white, while if a black throughbred were crossed with an albino the first generation would all be black.

Care of Film.

When you buy a photographic film from the dealer do not imagine that all you have to do is to put it in the camera and pictures will follow as a matter of course.

As a matter of fact, more pictures are spoiled in the handling of the film than by other accidents; and although the job of loading and unloading the camera is apparently so simple, care must be exercised all the time.

You must remember that the emulsion on the film is just as sensitive as

the emulsion on a plate, and the slightest ray of light that reaches it in any part will spoil a portion of it.

The new roll is wrapped so tightly that light cannot reach the film, but if it is allowed to become slack there will be trouble. Therefore, when the gummed label is taken off be very wary that it is not allowed to become loose in the folds. The fingers must grip it firmly all the time.

The films are called "daylight loading films," but the wise photographer will always seek a shady place or an indoor room in which to do the loading.

The winding in the camera must always be done slowly, care being taken to stop immediately the number appears in the red disc at the back of the camera, otherwise the pictures will overlap. Two pictures are often spoiled in this way.

The same care must be taken in unloading as in loading. Do not get in a strong light, and keep the roll tight all the time. The black patches along the edges of a developed film are caused by failure to observe these simple precautions.

If the roll is to be sent to a photographer or chemist to be developed, take care that it is not only folded up tightly, but also firmly fastened and covered with brown or black paper.

It is very important that acid hypo and not plain hypo be used for films. If plain hypo is used there will be dirty marks on the negatives and these marks will show on the prints.

Value of Proper Diet.

The urgent need of the Indian people is to observe a few fundamental principles in regard to diet. The most recent discovery in respect to food for human consumption is that vitamins are absolutely essential to properly nourish and develop the human body. Exhaustive experiments tried on animals has proved beyond doubt that, although supplied with plenty of good food, if vitamins are absent, debility and death results. The lemon is a preventive of scurvy and other similar diseases, although only an infinitesimal proportion of that fruit consists of vitamins. No animal produce vitamins; only vegetables. Butter fat, however, contains vitamins, likewise milk and cheese, on account of cows feeding on green food, thus absorbing vitamins. Eggs, because of fowls feeding on green stuff, also contains vitamins. Cod liver oil full of vitamins, due to the cod fish devouring big quantities of small fish, who again prey on smaller fish who feed on sea vegetation; hence the vitamins in the cod fish.

Eye troubles, and many other common diseases, are directly traceable to lack of vitamins in the human system. Fruit and vegetables (containing vitamins) promote growth and reproduction—in fact, are essential to the latter. Tomatoes are especially charged with vitamins, and were, perhaps, the most valuable of all foods in this regard.

The canning of fruit and vegetables did not entirely destroy the vitamin properties. Polished or prepared rice do not contain any vitamins, which re-

main in the husk and residue of the rice removed in the course of preparation for food. The necessity of vitamins is very great indeed. The undeveloped young generation is the sorry result of shortage of vitamins in their food.

New Alloy For Die Casting.

Alloys, rich in zinc that are used considerably for certain die cast parts, generally have the disadvantage that the resulting castings, after a certain time, have a bad appearance and oxidation tends to ruin the pieces. These disadvantages are obviated by new zinc alloy which contains copper and a slight addition of nickel plating. The slight addition to the nickel has a most favourable effect upon the casting qualities of the alloy rendering it more fluid and giving more homogeneous castings. The nickel content should be low generally in the neighbourhood of 1 per cent. and never over 5 per cent.

Weather Signs.

It is not always easy to tell what the weather is going to be but a few signs are very reliable. When it is raining you will sometimes notice that the sky starts to clear in the form of an arch. Close to the horizon you can see the little half-circle which is the beginning of the arch that will sweep across the sky until there are no clouds left. Then you may be certain it is not going to rain again for some time.

Look at the clouds at almost any time of the day, and if these get smaller or remain about the same size, rain is

not likely. Should the clouds get bigger expect showers soon.

In the weather the wind increases up to midday and then gradually dies down. If the wind does not get less after noon, and still more if it blows harder towards sunset you may be almost sure bad weather is coming.

A Lost Continent.

The Atlantic Ocean is now-a-days supposed to roll over a lost continent. Le Plongeon, who deciphered the hieroglyphics among the ruins of Yucatan, in Central America, came upon inscriptions describing a catastrophe which submerged the old Atlantean continent, legends of which have survived in literature from the earliest times.

It may be that this catastrophe gave rise to the equally widespread belief in the Flood which destroyed the early inhabitants of our planet. Certain it is that the American continent, although called the New World, is geologically the oldest land on the globe, and the monuments found in the jungles of Yucatan, were ancient when the Pyramids of Egypt were built.

The catastrophe is supposed to have taken place about 9000 B. C., and at that time there was a highly organized civilization in Yucatan, which would seem to be a remnant of the lost continent. It is not a very large country, yet, in spite of the great difficulties of exploration, the ruins of 172 cities have been

discovered. Some of these are so extensive that they must have contained half a million inhabitants, and it is possible that the pyramids found in the jungle gave the pattern at a much later date to the Pharaohs of Egypt.

Making New Fruits.

There is no standing still in the world of fruit-growing. Every year new developments take place, and the hybridiser is, by cross fertilisation, constantly producing new varieties, some of which bear little or no resemblance whatever to the parent plant.

Many of these new varieties have no value, commercially or otherwise, and are merely cast aside as worthless. Yet the many experiments made more than justify themselves if one gem is secured.

Cremated with Your Own Heat.

If it were possible to so enclose a man that he could continue to breathe and no heat could escape from his body, he would die within a short time—such is the astounding assertion made by an American mining engineer. The normal temperature of the human body is about 98.5 F. and whenever work is done by the muscles, indeed even when sitting still the normal bodily processes generate heat which must be given off, otherwise the body will become overheated and a number of bad effects will result. The human body, like any other internal combustion engine must be cooled in order to function properly.

FORMULAS, PROCESSES & ANSWERS.

Saponin and its Preparation.

698 L. M. Khan & Co. Desire to know what saponin is and how it is manufactured.

The term "saponin" of late years has been applied to a class of glucosides which possess the common property of being poisonous and when dissolved in water, form solutions which froth on shaking like soap suds. The substances which have these properties are not all of the same series chemically. A few are enumerated. Saponin or senegin; Quillaja-sapotoxin, sapindus-sapotoxin; Gypsophila-sapotoxin; Agrostemma-sapotoxin, etc.

There are some 150 distinct plants which thus yield saponins; a few of these plants are as follows:—Saponaria officinalis; Gypsophila struthium; Agrostemma githago; etc.

Saponin is a white amorphous powder, very soluble in water, to which it gives the curious property of frothing just like soap solution. Saponin is neutral in reaction, it has no odour but causes sneezing if applied to the mucous membrane of the nose; the taste is at first sweet, and then sharp and acrid. The saponins have marked haemolytic properties. Saponin is soluble in phenol.

Saponin is separated from bread flour and similar substances by the following methods. The process essentially consists in extracting with hot spirit,

allowing the saponin to separate as the spirit cools, collecting the precipitate on a filter, drying, dissolving in cold water, and precipitating with absolute alcohol. In operating on animal tissues a more elaborate process is necessary. The finely divided organ is digested in alcohol of 80 to 90 per cent. strength, and boiled for a quarter of an hour; the alcohol is filtered hot and allowed to cool, when a deposit forms consisting of fatty matters and containing any saponin present. The deposit is filtered off, dried, and treated with ether to remove fat. The insoluble saponin remaining is dissolved in the least possible quantity of water, and precipitated with absolute alcohol. It is also open to the analyst to purify it by precipitating with baryta water, the baryta compound being subsequently decomposed by carbon dioxide.

Copper Refining.

609. Ramanath Bakshi. Requests us to publish how copper is refined.

The black copper may be refined in reverberatory furnaces or electrolytically. The reverberatory furnaces which are used have a small siliceous hearth, or to which the black copper is introduced and raised to a high temperature for 6 or 7 hours, all the apertures of the furnace being closed. High temperatures are more easily reached in small than in large furnaces. When the mass has been

thoroughly heated and melted large quantities of air are injected and a portion of the impurities consisting of zinc, lead, arsenic, tin and sulphur, is thus volatilised, another portion consisting of iron, nickel, and a part of the zinc and lead, being converted into slag by the silica of the furnace hearth. This slag floats on the melted copper and can easily be separated. Cuprous oxide is formed on the surface and penetrates into the molten metal, giving off oxygen to the copper sulphide which is still present, with evolution of sulphur dioxide. Copper remains, which contains a little cuprous oxide and a little sulphur dioxide. In order to reduce and eliminate these products, large poles of green wood are introduced into the copper and evolve steam, hydrogen and carbon monoxide and hydrocarbons, which stir up the mass. All the sulphur dioxide is thus eliminated and a large portion of the cuprous oxide is reduced to metallic copper. The last traces of cuprous oxide are reduced by throwing powdered wood charcoal into the furnace; pure malleable and ductile copper finally remains. The electrolytic refining of copper gives a very pure product. The black copper is cast in moulds 1 metre long, 0.50 metre broad, and about 2 cm. deep, and the slabs thus obtained are subjected to electrolysis, by using them as anodes in an electrolytic bath and depositing electrolytic copper on plates of pure copper which form the cathodes.

To Sugar Coat Pills.

501 Eastern Chemical Society. Enquires how pills are coated with sugar.

Pills to be sugar coated must be very dry, otherwise they will shrink away from the coating and leave it a shell, easily crushed off. Then take starch, gum arabic and white sugar, equal parts, rubbing them very fine in a marble mortar, and if damp they must be dried before rubbing together; then put the powder into a suitable pan or box for shaking; now put a few pills into a small tin box having a cover and pour over them just a little simple syrup shaking well to moisten the surface only, then throw into the box of powder and keep in motion until completely coated, dry and smooth.

Absorbent Cotton.

650. Narain Singh. Asks what is absorbent cotton and how is it made?

Absorbent cotton is obtained from the hairs of the seed from one or more of the cultivated varieties of *Gossypium* freed from adhering impurities and linters and deprived of fatty matter. Purified cotton wool is cellulose in one of its purest forms. For a long time one of the most important uses of this valuable staple, that of an absorbent and substitute for sponge, was neglected, because a trace of fatty matter was permitted to remain, which coated the filaments and prevented them from absorbing liquids freely and uniformly. The so-called absorbent cotton of commerce was introduced and it soon became an important product. This is cotton freed from the trace of fatty matter by boiling it in a weak alkaline solution, rinsing it in a weak solution of chlorinated lime to whiten it dipping it

into a very dilute solution of hydrochloric acid and then thoroughly rinsing it with pure water; the cotton having been thoroughly dried, is then carded. The loss is about 10 per cent.

Extracts of Crude Drugs.

671. P. Narayana—Wants the process of preparing liquid extracts of crude drugs.

The soluble constituents of crude drugs are separated from inert fibrous matter by suitable treatment. This operation is known as *Extraction* while the solvent is technically known as the *menstruum*. The chief methods employed in extraction are infusion, decoction, maceration and percolation. Of these basic operations there are modifications, such as digestion, pressure, maceration, and repercolation. The process selected in any instance depends on one or both of two conditions: (1). Length of time the preparation is to be kept, (2). Nature of the drug. There are two principal solvents in common use—water and alcohol. If the preparation has to be kept indefinitely an alcoholic solvent must be used. Drugs in which the active principles are of a resinous or oily nature require a strong alcoholic menstruum, whilst those containing active ingredients soluble in water may either be extracted by water or weak alcohol.

(1) **INFUSION** is the process employed for drugs in which the active principles are readily soluble in water. It consists in steeping or infusing the coarsely divided drug in hot or cold water, as the case may be, for a definite

length of time and straining off the liquor which is ready for use.

(2) **DECOCTION** is the process employed when the active principles are soluble in hot water, but the drug is tough and does not readily yield to infusion. In this case the drug is boiled with the water for certain period.

(3) **MACERATION** is analogous to infusion, but the menstruum is alcoholic, and the operation is conducted at ordinary temperature. The process is carried out in a closed vessel to prevent loss of alcohol. The bruised or contused drug is placed in the vessel together with the whole of the menstruum ordered. The vessel should be shaken or the contents stirred daily for seven days. At the end of the time the liquor is strained from the residue or marc, which is strongly pressed and the expressed liquid mixed with the strained liquor. The whole is then allowed to stand until clean, or is filtered.

(4) **PERCOLATION** is considered in the majority of the cases to be the most perfect method for obtaining the active principles of drugs in solution. Briefly it consists in allowing a liquid (the menstruum) to trickle slowly through a column of the material in such a way that every solid particle is in its turn submitted to the solvent action of the gravitating fluid.

Colour for Printing Inks.

654. Srinivasulu Naidu.—Asks what are the suitable colours for printing inks.

Printing inks may be made in a number of colours the principal of which are:

BLUE—(a) Indigo gives a deep but dull blue: it is cold but permanent. (b) Prussian blue needs much grinding and extra soap; it affords a deep bright colour and is useful for making greens.

GREEN—Various shades of green may be produced by suitable admixture of blues and yellows. Prussian blue and chromate of lead make a good rich green; indigo and the same yellow a deeper, duller colour.

PURPLE—Different shades of purple may be made by grinding together carmine or purple lake with prussian blue.

RED—(a) Carmine may be readily ground into a fine ink of brilliant colour by admixture with black ink varnish made with balsam of copaiba. It is expensive but valuable for special purposes. (b) Vermillion may be used for red ink where neatness is required. It requires much soap to make it work clean. (c) For cheap work, such as posting-bills, red-lead may be used; it requires additional soap to make it work clean and its colour soon changes to black.

YELLOW—(a) The highest yellow is obtained from chromate of lead, which is easily ground into a fine ink, works freely and well and requires but little soap beyond what the varnish contains. (b) Yellow ochre is easily ground into a fine ink; it gives a useful colour dull but permanent.

Asphalt Varnish.

676. M. Chandani—Wants a recipe for asphalt varnish.

A solution of 1 part of caoutchouc in 16 parts of oil of turpentine or kerosine is mixed with a solution of 16 parts of

copal in 8 parts of linseed-oil varnish. To the mixture is added a solution of 2 parts of asphalt in 3 parts of linseed oil varnish diluted with 8 or 10 parts of oil of turpentine, and the whole is filtered. This is a fine elastic varnish.

Havana Flavour for Tobacco.

461. Saiajid Azim.—Enquires how Havana flavour can be imparted to tobacco.

Here is a French recipe for giving Havana flavour to tobacco. The tobacco is first soaked from 6 to 12 hours, according to its rankness, in tepid or hot water. This is to dissolve out and remove a gummy substance that gives the tobacco its offensiveness. While macerating, the leaves are frequently stirred, or gently squeezed by suitable machinery, and the water is changed as often as may be necessary to facilitate the process. After soaking it is gently pressed out, rinsed and dried. After drying, it is treated with an infusion of the stems and ribs of genuine Havana tobacco, either by sprinkling or by immersion and maceration according to the uses to which the finished product is to be put.

When the tobacco is intended for use in cigars it may be treated with any of the following formulae.

(a) Fluid extract of valerian, 1 part; tincture of tonka bean, 8 parts; 94 per cent. alcohol, 23 parts. Mix.

(b) Tincture of valerian, 3 parts; butyric aldehyde, 4 parts; tincture of vanilla, 2 parts; ethyl nitrite, 1 part; 94 per cent. alcohol, 40 parts; water, qs. 128 parts. Mix.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

625. J. M. Gandhi.—Refer your query regarding cotton decorticator and other allied machines to American Trade Commissioner in India, Grosvenor House, 21, Old Court House Street, Calcutta.

626. M. D.—For industrial books enquire of Chackraverty, Chatterjee & Co., Ltd, 17, College Square, Calcutta.

629. Gendial Singh & Bros.—Laces of various designs may be bought of H. Ahmed Allawala, 69, Khengrapatty, Barabazar, Calcutta and A. R. Wimalaseri, Dangedas, Galle, Ceylon. For chicon work enquire of The Drapery Stores, G-13-14, Municipal Market, Calcutta.

630. Lachman Agency.—There is no such expert known to us.

631. R. Seshaih Raju.—Formula of wash-soap appeared in May, 1925 issue.

634. V. Raju Mudaliar & Sons.—Recipe of tooth powder will be found in March, 1925 issue.

635. S. B. Tewary.—Picture frame making materials may be bought of Behary Lall Dey, 14, 15, 16, Swallow Lane; Fotic Lall Seal & Sons, 10, Swallow Lane and Roy, Babajee & Co., 182, Lower Chitpur Road, all of Calcutta.

636. H. E. Abdul Hameed.—Recipes of pain balm appeared in December, 1922 issue. There is nothing known as cinnamic acid.

637. Saiyid Azim.—Palm Oil may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. Methylated spirit can not be deodorised.

641. Murlidhar Rathi.—Waste papers are used for making pulp for paper and in packing. For selling waste papers write to B. Tarafdar & Co., 126-A, Anherst Street, Calcutta. Golden letters are printed on book covers by placing golden leaves (available in the market) on book covers and pressing with required types as is done in ordinary printing. Golden leaves may be bought of Calcutta Book Binding Materials Trading Co., 68, Baitakhana Road, Calcutta.

642. V. Deva Rao.—Watches may be bought of Abrecht & Co., 17 and 18, Radhabazar Street and Esoofally Hiptolla & Co., 10, Radha Bazar Street, both of Calcutta. Perfumeries may be had of B. K. Paul & Co., 1-3, Bonfields Lane, and Sikri & Co., 55-8, Canning Street; both of Calcutta. For rolled gold buttons enquire of S. A. A. Bakshi & Co., 7, Colootola Street, Calcutta. Indian directory may be bought of Thacker, Spink & Co., 3, Esplanade East, Calcutta.

643. R. S. B. Singh.—The following is a list of service securing agencies: Service Procuring Agency, London House, Lansdowne Road, Apollo Bunder, Bombay; Peern & Co., 9, Nazir Lane, Kidderpore, Calcutta; Employment Bureau, Kirlaskar Theatre, Poona City; Service Securing Agency, Delhi and C. P. Service Securing Agency, Jubbulpore.

644. Prof. Bhannah.—Ordinary printing machines will not do in case of tin printing; tin printing machines may be supplied by Fuchs Long Mfg. Co., New York, U. S. A. Yes, you will have to take Government's permission for starting business on coupon system as it is a kind of lottery. Used coffee powder will be of no avail.

646. M. L. Narayana & Sons.—There is no such university known to us where necessary arrangements have been made for students to appear in degree examinations by private

SETT DEY & Co

ORIGINAL HOMEOPHARMACISTS,

42, Strand Road, Calcutta.

Dealers in Original Homoeopathic dilutions
and Biochemic Triturations.
Catalogue Free on Application.

studies only. Want to be put in touch with dealers in betelnuts in Nagpur and suppliers of spices, pepper and sago.

647. Vittal & Co.—Formula of preparing Turkey red oil appeared in November, 1924 issue.

649. S. V. Krishna Row.—Magical apparatuses may be bought of Prof. Bhannah, K. R. Tank, Madura and Prof. K. S. V. Nath, Pudukotai.

651. Baldeo Das & Sons.—Green colour may be bought of Aminchand Mehra & Sons, 34, Armenian Street, Calcutta.

652. Jagannath Malewar.—For lac industry go through some books on the subject which may be supplied by Chackraverty, Catterjee & Co., 15, College Square, Calcutta.

653. K. Nain.—Refer your enquiry to the Director of Agriculture of your province.

655. A. K. Narayan.—Fish oil may be supplied by Fisheries Dept., Madras and Paul Vrayar, Meed Street, Nagercoil.

656 R. Srinivasagopalam.—There is demand for gold and silver laces in Bombay side, in the Punjab and in Kashmir. These are mainly used as border of cloths worn by ladies. So this industry has a great prospect. Silver and gold thread may be bought of Amitava Ghosh, 133, Canning Street, Calcutta and Tribhuvandas Vullabhdas Jariwala, Rampura, Surat.

657. Dalal Ch. Baruah.—Precious stones may be supplied by Rai Badri Dass Bahadur & Sons, 152, Harrison Road, and Benud Behary Dutt, 1-A, Bentinck Street, both of Calcutta.

658. K. K. Shamanna.—Recipe of label paste on tin appeared in June, 1924 issue.

659. Tin Maung Bros.—Refer your query regarding invisible light to Bose's Research Laboratory, 92, Upper Circular Road, Calcutta.

661. H. K. Mansharamani.—Articles on rubber stamp making appeared in January and March issue of 1924. For suggestion for spare time works go through New Idea columns of "Industry." For addresses of Indian newspapers and periodicals go through Thacker, Spink & Co., 3, Esplanade East, Calcutta.

662. Daulat Ram Vidya Perakash Sud.—Picture postcards and pictures may be bought

of Roy, Babajee & Co., 182, Lower Chitpore Road, and Tarachand Pursrain & Co., 57, Park Street, both of Calcutta.

663. S. S. Haider & Co.—Yes, you may supply "ghee" to Calcutta. For this purpose you may write to Durga Charan Ruckshit & Co., Cross Street, Calcutta.

664. C. S. Mahamood.—Silk and silk wastes may be bought of Dass Talukdar Agency, Strand Road, Gauhati, Assam; Murshidabad Silk Store, Jiagang, Murshidabad and K. D. Hariram & Co., 10-A, Lindsay Street, Calcutta.

667. K. Machiraju Sarma.—An article on condensed milk appeared in November, 1920 issue.

669. Bulkidas Chandulal.—Formulas of hair dye will be found in January, 1925 issue. Recipe of otto hena will be found in September, 1924 issue.

670 Shaw's Mfg. Co.—Vegetable Oil contains fats and other materials. Vegetable fat is derived from vegetable oil. An article on margarine appeared in August, 1921 issue. If you go through the article you will get the necessary information regarding margarine. Refining of cotton seed oil involves high technicalities and requires many machineries.

672. P. A. Krishnan—Wants addresses of Penang.

674. V. E. R. M. Ramaswamy Chettiar.—Gramophones may be had of K. C. Dey & Sons, 96, Lower Chitpore Road, and S. N. Bhatta-

BOMBAY DESHI OUSHADHALAYA.

Factory & Dispensary.

ASK FOR ANY FEVER

Ague Killer.

1 Phial as. 8

Doz. Rs. 5.

and our other popular remedies. Can be had everywhere at Cheapest Rate.

**PEARL & CO., Victoria Garden,
BOMBAY.**

charjee, 5, Dharmatola Street, both of Calcutta

675. Nathoo Ram.—Dentistry is taught by Calcutta Dental College and Hospital, 261 Bowbazar Street, Calcutta.

677. H. C. Chandra & Co.—For books on astrology, write to Astrological Bureau, Dhanwantari, Bhandara and Nageshwar Press, Banskaphotak; both of Benares.

678. P. V. Shah.—For the address of the required jointstock company write to Registrar, Jointstock Companies, Government Place, Calcutta. Small ice making machines may be bought of Alex Brault, 6-A, Wellesley Place, Calcutta.

679. C. Bala Subramania Pillai.—The following are perfumers: H. Bose, 61, Bowbazar Street; P. M. Bagchi & Co., Goolu Ostagar Lane, and Bengal Chemical & Pharmaceutical Works, Ltd., 15, College Square; all of Calcutta.

680. Dalip Singh.—For taking agency write to manufacturers direct.

683. R. C. Chowdhury & Sons.—Write to Director of Industries, Bihar and Orissa, Patna for particulars regarding Bihar industries.

685 G. S. Bedi.—Sodawater machines may be bought of Little & Co., 3, Grant Lane and Aminchand Mehra & Sons, 34, Armenian Street; both of Calcutta. For particulars regarding camera write to the advertiser. For hair oils go through pamphlet on Hair Oil Manufacture, published from this office.

687. Ramsons & Co.—Formulas of candle making appeared in last April issue. Candle making apparatuses may be supplied by Oriental Machinery Supply Agency, Ltd., 20-1, Lall Bazar Street, Calcutta. Neem Oil can not be deodorised. Process of deodorising coconut oil appeared in August, 1921 issue of "Industry."

688. Mubarik Ali.—For converting paper marks into gold marks write to Nederlandsche Handel Mattschappy, 81-84, Esplanade Road, Fort, Bombay.

689. Aftab Ahmed Gulam Ahmed.—No better substitute of chloroform is available.

690. Sunder Row.—Perfumeries may be supplied by Schimmel & Co., Miltitz, Near

Leipzig, Germany. It will not be advisable for you to import soap mould from foreign countries. Soap mould may be bought of S. A. Manan, 2, Machua Bazar Street, Calcutta.

691. S. Bagchee & Co.—Try to get your son admitted as an apprentice in a canning manufactory. For this purpose you may correspond with Pioneer Condiment Co., Dum-Dum Jn. and Bengal Canning & Condiment Works, 5, Halsi Bagan, Calcutta.

692 Indo-British Trading Co.—For fancy goods enquire of Laurel Novelty, 43, Park Street and Mahmedally Javerjoe, 37-4 and 37-5, Canning Street; both of Calcutta.

693 I. C. Gandhi & Co.—Recipe of toilet soap appeared in last April issue and formulas of tooth paste appeared in August, 1922 issue.

694. Monohar Lal Bhatnagar.—Softness of soap manufactured by you is probably due to impurities in "til" oil used by you. Property of "til" oil is to stiffen soap.

695 C. C. Shah—Get your clay analysed by some chemist, who will supply you necessary information. For analysis you may try R. V. Briggs, 8-B, Lal Bazar Street, Calcutta.

696 Hariram Sadanand Khanna.—For small grinding machines try W. Leslie & Co., 19, Chowringhee, Calcutta. Silk Yarns may be supplied by Alexander Clark Co., Ltd. 125 and 126, Fenchurch Street, London, E. C.3; Ardizzone Luigi, Ardizzone Luigi, V. Roma, 60, Genoa, Italy and N. V. Nederlandsche Kunstzijdefabr, Vasdijk 9, Amsterdam, Holland. Celluloid bangles may be supplied by Koyamasada & Co., 1, Chome, Minamikyutonomachi, Higashi-ku, Osaka, Japan. For the required machine write to Oriental Machinery Supply Agency, Ltd., 20-1, Lall Bazar Street, Calcutta.

697. K. Subramaniam.—For fruit essences try D. G. Gore, Sayana Bldg., Lahar Chawl,

LIMITATION OF FAMILY.

Third Ed 5 Portraits, 55, Engravings.

357 Pages, Price Rs. 3, Postage Extra.

A comprehensive and Confidential Treatise Every parent desiring to regulate the number of children according to his health and means will find it a god-send. Ask for table of detailed contents which will be sent free.

K. M. DAS & Co.

29-1, Telepara, Sampooker St., Calcutta.

Bombay Colouring ingredients may be bought of Bhavnagar Chemical Works, Vartej, Kathiawar

699 Jagannath Malewar—Betel leaves can not be preserved for a long time

702 T. K. Janakiram—Your query being in the nature of an advertisement should not be published in these columns

706 P. A. Krishnan—To improve sale and to secure work for electroplating advertise in widely circulated papers like "Industry"

707 T. Narayanamurthy—Your query is not in our line

709 L. S. Achari & Sons—For sheet metal machines write to Taylor & Challen, Ltd., Birmingham England. Nib making machines may be supplied by Bengal Small Industries Co., 9, Durga Charan Mitter Street, Calcutta

710 Buta Singh Jain—Process of decolorising coconut oil appeared in August 1921 issue. You perhaps mean potato celluloid, formula of which appeared in July, 1922 issue. Your enquiry regarding ice making has been forwarded to the writer of the article for proper step

711 Lakhana Brothers—Umbel is an ochreous ore of earth, of fine and compact texture, dry feel, adhering a little to the tongue and composed of silica, oxide of iron, manganese and water, used as a brown pigment and sometimes in colouring porcelain. Litharge is plumbic oxide manufactured by the oxidation of lead in a current of air. Vernacular equivalents of arnatto are "latkan, lathkan and watkana". Vernacular equivalents of fennel are "saunf,"

SOAP AND PERFUME MANUFACTURERS.

**FREE - - -
SAMPLES**

of perfumes for above trade will be sent on receipt of the inquiries from bona fide manufacturers. Excellent qualities of the highest strength

PRICES LOWEST.

Write for Samples to-day—

**Anglo-Indian Drug & Chemical Co.,
155, Juma Musjid Circle, P. O. Box 2082
BOMBAY**

"bari saunf," soap," "mauri," etc., Fluor is a kind of mineral found in Derbyshire in cubical and octahedral crystals of great beauty. Whey is curdled milk left after churning milk for preparing butter. For carnauba wax try Bengal Scientific Supplies Co., 29, College Street Market, Calcutta. Formula of red marking ink appeared in September, 1923 issue. Address of tin printers will be found elsewhere in these columns

712 Syed Abdul Quadri—You may consult Indian Agricultural Journal to be had of Thacker, Spink & Co., 3, Esplanade East, Calcutta

713 K. Subramanyam—Saccharine may be bought of B. K. Paul & Co., 1-3, Bonfields Lane Calcutta

715 Kishan Lal Girdhari—Refer your enquiry to High Commissioner for India, 42 Grosvenor Garden, London, S. W. 1

716 Haridhone Dutt—Cameras and photographic materials may be supplied by Reinhard Hugin Loorach, Photohaus Leisegang, Potsdamerstrasse, 138, Berlin and Klimax-Camera Werkstätten, Theodor Harbeis, Leipzig, all of Germany

718 Jatindra Lal Dass—Your enquiry is not in our line

719 Pegu Electric Supply Co.—Leather goods are manufactured by Calcutta Industrial Leather Works, 1, Pollock Street, Calcutta; North West Tannery Co., Cawnpur and Sircar Bros., 6, Russa Road North, Calcutta

720 Malhardas Tekchand & Co.—Seek medical advice. Recipe of depilatory soap appeared in April, 1925 issue

721 Ram Chand Bharagava—Process of preparing fountain pen ink appeared in August, 1924 issue. Recipe of toilet soap will be found in April, 1925 issue. An article on paint manufacture appeared in the same issue. Soap stone is used as a filling agent in soap making. Please go through New Idea columns of "Industry" for increased sale of your goods send circular to prospective buyers.

722 C. R. Desai Bros.—Laces may be supplied by Hiralal Nandalal Kshetry, 38, Mugapaty, Bara Bazar and H. Ahmad Hosain

Allawala, 69, Khagrapatty, Bara Bazar; both of Calcutta.

723. Chandi Ch. Biswas.—Formula of artificial ivory appeared in March, 1922 issue.

727. Parkash Dev.—Soot-black may be supplied by Joy Gopal Dutt & Bros., 40, Clive Street, Calcutta. An article on Boot polish appeared in June, 1923 issue. For looks on boot polish write to Chakraverty, Chatterjee & Co., Ltd. 15 College Square, Calcutta. For cheapening hair oils you may use ordinary oil in place of floral oils, but quality will much deteriorate thereby. Animal charcoal may be bought of R. C. Gupta & Sons, 84, Clive Street, Calcutta.

729. K. C. Dutta Gupta.—Dry ginger is called "sunth" in Bengali. Process of preparing dry ginger appeared in April, 1923 issue. Your other queries being in the nature of an advertisement, should not be published in these columns.

731. Mohanlal Desabhai Dave.—Your name has been entered in our directory for future references.

733. S. Raja Gopal Pillai.—Piece-goods may be bought of Bhajraj Baboolal, Old Generalganj, Cawnpore and Ahmedabad New Cotton Mills Co., Ltd., Kankaria Road, Ahmedabad. Condensed milk may be supplied by Malik Hiranand & Sons, Bunder Road, Karachi. It is not possible to do job work with pocket printing press. There is no such permanent organisation for drawing lotteries regularly.

734. S. Shivasankara Iyer.—If any letter is received in response to your enquiry it will be duly redirected to you.

735. Madras Swadeshi Varthaka Sangam.—Splints and veneers for match making may be supplied by Bhawani Engineering & Trading Co., 122/1, Upper Circular Road and Sunderban Match Works, 12, Dalhousie Square; both of Calcutta.

737. A. Guruswamy Naidu.—For the required machines try Oriental Machinery Supply Agency, Ltd., 20-1, Lall Bazar Street and W. Leslie & Co., 19, Chowringhee; both of Calcutta.

738. D. N. Dutta.—For textile machineries write to Bros Partner & Co., 35, Ezra Street,

Calcutta; H. M. Mehta & Co., 123, Esplanade Row, Fort, Bombay and Textile Machinery & Stores Co., 61, Apollo Street, Fort, Bombay. Silk may be bought of Sasanka Sekhar Bagchi, Khagra, Murshidabad; Bhagalpur Silk Stores, Sujaganj, Bhagalpur and Manniram Harjiwanram, Gaighat, Benares City.

739. V. Subramania Iyer.—Process of preparing chalk crayon appeared in February, 1924 issue.

740. P. L. Agarwalla.—The following is the list of Homeopathic Institutions: Calcutta Homeopathic College, 150, Cornwallis Street; National Homeopathic Medical College, 336, Upper Chitpur Road and Chicago College of Homeopathy, 89, Sham Bazar Street; all of Calcutta.

741. Knedy Singh.—The required address is not known to us.

742. Albert Martis & Co.—Fancy goods may be supplied by Blackwell Robert & Co., 12, Gresham Street, London, E. C. 2; Tritzsche Willy, Schiessg, Dresden, Germany and Pacific Novelty Co., 41-E, 11th Street, New York, U. S. A.

744. B. Agarwalla.—For books on industrial subject write to Chakraverty, Chatterjee & Co., Ltd., 15, College Square, Calcutta.

745. I. Reala.—Refer your query to the Agricultural Dept. of your province.

748. C. Arunachalam.—For hair oils please go through booklet on Hair Oil Manufacture, published from this office.

749. Durga Prasad.—Pill making machines may be bought of Oriental Machinery Supply Agency, Ltd., 20-1, Lall Bazar Street, Calcutta.

751. Utsava Rao.—Process of preparing carbon rod appeared in September, 1924 issue.

752. J. N. Chedi.—An article on photo blocks in printing appeared in February, 1923 issue. For litho press enquire of K. Banerjea, 133, Canning Street, Calcutta. All sorts of printing presses will be supplied by the above firm. Treadle printing machines may be bought of Eastern Engineering Works, Sham Bazar, Calcutta.

753. R. P. Misra.—It is not possible to improve the sound of a gramophone. Java sugar may be bought of Hajee Ahmed Ganny, 23, Amratola Lane, Calcutta and Hajee Abdulla Hajee Tayab, Bandri Street, Khand Bazar, Bombay. Gold may be supplied by Binraj Zorawarmak Bhatia, 2, Raja Woodmunt Street, Calcutta. For grains enquire of Jagindra Nath Dass, 25, Pollock Street, Calcutta. Soapstone is hydrated silicate of magnesia, with a smooth greasy feel like that of soap and so soft as to yield to the nail. It is a massive variety of talc which when pure and compact is much used as a refractory material for lining furnaces, being infusible in any ordinary furnace heat. It is easily turned in the lathe, or cut with knives and saws, and is made into culinary vessels. When reduced to powder, it is used like plumbago as a lubricator and to minimise friction, as well as to give a surface to some kinds of paper-hangings. No, it is not used for caustic soda. Seek legal advice. You may go through the Chamber of Commerce Journal of Yokohama, Yokohama, Japan. Use your own discretion; we cannot venture opinion on such subject.

754. Ghaisas & Co.—Process of preparing various kinds of scents appeared in September, 1924 issue. Embroidery machines may be supplied by Maschinenfabrik Kappel Akt-Kes, Chemnitz-Kappel and Ludwig Eberle, Barmen; both of Germany. Glass wares may be supplied by Theodor Eismann, Leipzig, Bayersche-strasse, 28, Germany; S. Stadler-Schnutker & Haizingerstrasse 47, Vienna XVIII, Austria.

755. R. Panchapakesa Ayyaravol.—Your enquiry is not in our line.

756. Narinda Singh.—Recipes of invisible ink appeared in February, 1925 issue.

757. S. Ramiahsarma.—There is perhaps no machine for making agatbattis.

758. K. A. Singan & Sons.—Gold and silver thread may be bought of Amitava Ghose, 33, Canning Street, Calcutta. For velvet jackets, etc., try Jahar Lal Panna Lal & Co., 134, Canning Street, Calcutta.

760. Hari Pado Bhattacharjee.—You may use guttapercha to stop the leakage. For-

mulas of film cement appeared in September, 1924 issue.

761. Anant Ram Sharma.—The subscription of "Industrial & Trade Review for India" is 12s. per annum.

762. O. L. Gupta.—Required thread balling machine may be supplied by Oriental Machinery Supply Agency, Ltd., 20-1, Lall Bazar Street, Calcutta.

765. Dento.—Process of preparing vinegar appeared in August, 1923 and January, 1924 issues of "Industry."

767. Uttam Singh.—All the addresses you require will be found elsewhere in these columns. It will be advisable for you to consult a directory which may be bought of Thacker, Spink & Co., 3, Esplanade East, Calcutta. Toys may be supplied by Pioneer Toy Mart, 234, Old China Bazar Street and K. B. Nan, 233, Old China Bazar Street; both of Calcutta. Boots and shoes may be bought of Bombay Leather Goods Depot, Yekan Ellappa Bldgs., 253-A, Grant Road, Bombay; Civil Boots and Leather Works, Ltd., 12, Old Post Office Street and The Mysore Tannery, 29-D, Bentinck Street; last two of Calcutta. Brass wares may be supplied by Abdul Rahim & Co., Gisraul Baria and M. N. Fazil Ahmed & Bros., Mothimasji Bazar, Chawki; both of Moradabad.

768. S. M. Arif & Sons.—Process of refilling dry batteries will be found in June, 1923 issue. Your name has been entered in our directory for future reference.

769. Mr. San Yone.—For zinc sheet write to Balmer Lawrie & Co., 103, Clive Street, Calcutta. For microscopes write to B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. For starting mail order business go through Mercantile and Mail Order Letters and Methods by Mr. K. M. Banerjee to be had of Industry Book Dept., 22, Sham Bazar Bridge Road, Calcutta.

770. D. N. Dutt.—For hand-loom try Bros. Partner, 35, Ezra Street, Calcutta. Addresses of silk yarn dealers appear elsewhere in these columns. For dyeing and bleaching it will be suitable for you to arrange with local dyers.

771. S. Kalupernall.—Recipe of sealing wax appeared in March 1925 issue.

772 Eshack Ahmed—All kinds of laces may be bought of H Ahmad Hasan Allawala, 69, Khangrapatty, Bara Bazar, Calcutta Ceylon laces may be supplied by Ambalangoda Trading Co, Ambalangoda and A R Winnalaseri, Dangedara, Galle, both of Ceylon Chic n Works may be had of the Drapery Store G 13-14, Municipal Market Calcutta For ladies dress materials and silk hosiery enquire of Drapery Store G 13 14, Municipal Market and Mallik Hussan Bros G 20 Municipal Market, both of Calcutta Silk yarns may be supplied by F B Bros & Co, 11 Dharamtala Street, Calcutta

773 H Chandra—Such tin cans are not available in India You may write to Jahnke Ltd 52 Myrtle Street Dorset Street Essex Road London N 1

774 Phool Chand—Perhaps the article mentioned by you refer to a trade name

775 Ram Das Malhantra & Co—For the address of the joint stock company write to the Registrar Joint Stock Companies Government Place Calcutta

779 C Ahmed Kunhi & Bros—Irrigating pans may be bought of Abinash Chandra Dutt Co, Monohar Dass Chawh 208 Harrison Road Bara Bazar Calcutta

782 A R Acharya—For studying homeopathy by correspondence write to C H Medical College 104, Corporation Street Calcutta as the foreign address is not available now You may consult Amateur Photographer and Photography, 20, Tudor Street, London F C 4 and British Journal of Photography Henry Greenwood & Co, Ltd 24, Wellington Street Strand, London, W C 2 It is not possible to give all the addresses of photographic companies of India You may however enquire of Calcutta Camera House, Chowringhee, Calcutta for your requirements What can we do for persons addressed to do not reply your letters?

783 Suraj Narain Gupta—The general process of distillation appeared in February, 1925 issue Formula of washing soap appeared in May, 1924 issue Cotton seed oil may be

bought of Indian Cotton Oil Co, Ltd Navsari, Humnum Street, Fort Bombay

784 H Venkoba Row—An article on ink manufacture appeared in December, 1922 issue

785 Soti Ram Saran—For stamping and pressing machines write to McKechnie Brothers, Ltd, Rotton Park Street, Birmingham, England For cut piece enquire of Hepworth Bros, Ltd Moorcraft Mills, Ossett, Yorkshire, England

786 Janki Das—For izarband making machines enquire of Oriental Machinery Supply Agency Ltd 20-1 Lall Bazar Street, Calcutta Embroidery machines will also be supplied by the above firm

788 Karm Chand—You will have to invest Rs 10,000 to start a saw Mill For printing press you may invest from Rs 2,000 to Rs 4,000

789 D Chopra—Refer your query to Student's Advisory Committee 7, College Sq Calcutta

790 G A Bhonsule—Stationery articles may be bought of Nilmany Haldar & Sons, 106, Radha Bazar Street Calcutta and K A Kerra-wala & Co 122-24 Parsi Bazar Street, Fort, Bombay Porcelain jars may be bought of Calcutta Pottery Works Ltd 45, Tangra Road and Gwalior Pottery Works, Ltd 2-A, Radha Prasad Lane, Sukea Street, both of Calcutta Animal charcoal may be supplied by R C Gupta & Co, 84 Clive Street, Calcutta Formula of bar soap similar to sunlight soap, appeared in August 1921 issue For hair oils go through the booklet on Hair Oil Manufacture, published from this office

791 Hariram Dwarkadas—Petroleum may be supplied by Asiatic Petroleum Supply Co, 94, Clive Street, Burma Oil Co, 101, Clive Street and Strand Oil Company of New York, 101-1, Clive Street, all of Calcutta The above firms will supply the necessary information regarding petroleum

793 Lalita Prasad—An article on tablet making appeared in the last issue Tablet making machines may be bought of Oriental Machinery Supply Agency, Ltd, 20-1, Lall Bazar Street, Calcutta

796. S. M. Abdulla Khader Sahib.—Can supply fish amber in very large quantities.

798. M. Pannagashayee.—Please explain what do you mean by rose tea. First powder tea, dilute in rose water, dry and when pasty make tablets.

799. S. Jagannadha Rao.—Kieselguhr may be supplied by B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. Ice making plants may be bought of Burn & Co, 7, Hastings Street, Calcutta.

800. T. G. Narayana Iyer.—You may consult Soap Manufacture by A Watt to be had of Chackraverty, Chatterjee & Co, 15, College Square, Calcutta.

801. K. V. Rangiah.—An article on tablet making appeared in May, 1925 issue. Tablet making machines may be bought of W. Leslie & Co, 19, Chowringhee, Calcutta.

802. Mohanlall Desbhai Dave.—Yes, you may use iron dust. Try to secure it locally. You may have your ink analysed by R. V. Briggs, 8-B, Lall Bazar Street, Calcutta.

803. Motamarra Sadavanta Moorthy.—Recipes of python eggs appeared in September, 1924 issue.

806. O. H. Rease.—Process of book edge decoration appeared in October, 1924 issue of "Industry." Other queries appear elsewhere in these columns.

807. K. Subramanyan.—Bitterness of neem oil cannot be removed

809. I. D. Lethe.—First soften horn and ivory then press with the mould.

810. Ramsankar & Co.—Your enquiry being in the nature of an advertisement should not be published in these columns.

811. Raman Lal.—Chalk sticks are manufactured by Nandan Trading Co., Phutalli Bazar, Agra.

812. T. S. Bhogal.—An article on phenyle appeared in October, 1924, issue. Process of preparing candles appeared in April, 1925 issue.

814. C. I. T. Co.—There is no such type-writing machine.

815. Himalayan Boot Factory.—Shoe making machineries may be supplied by Landis

Machine Co., St. Louis, Mo, U. S. A. If you melt rubber quality will much deteriorate.

816. S. H. Shah.—For photo enlargement write to Artistic Reproductions Co., 38, York Place, Edinburgh, Scotland.

818. Chunilal R. Dave.—For technical education you may write to Principal, Bengal Technical Institute, Jadabpur, Dhakuria, 24-Parganas.

820. Salar Ahmad.—Lead foils may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta

821. Govind Prasad Verma.—Second-hand books may be supplied by Khalil Ahmed, 18, Shama Charan De Street, Calcutta.

822. P. D. Verma.—For industrial books enquire of Chackraverty, Chatterjee & Co, 15, College Square, Calcutta.

823. S. R. Saha Brother.—Please go through the article on tablet making that appeared in the last issue.

824. P. K. Salar & Co.—Damp-proof glue may be bought of Oriental Industrial Co., 9, Bonfields Lane and P. Mukherjee Co., 29-32, College Street Market; both of Calcutta. Formula of bar soap similar to sunlight soap appeared in August, 1921 issue. Match splints may be supplied by Sunderban Match Works, 12, Dalhousie Square, Calcutta. Apply heat for melting rosin.

828. Devi & Co.—Wools may be supplied by E. B. Bros & Co., 11, Dharamtala Street, Calcutta. Tassar and silk may be bought of

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These are of newest style watches fitted with high grade swiss mechanism. Glass crystal lined, figures Arabic or Roman. Their designs and Finish will satisfy the most critical test, and in appearance equal to sovereign gold very charming to look at and perfect time keeper guaranteed for 3 years, with leather or silk strap free.

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Sasanka Sekhar Bagchi, Khagra, Murshidabad; Bhagalpur Silk Stores, Sujaganj, Bhagalpur and Har Chand Ray Anand Ram, 207-1, Harrison Road, Calcutta. Consult Indian directory for required addresses. For stiffening soap add 20 to 25 per cent. sesame oil.

829. Basant Lall Shah.—For learning cutlery write to Krishna Cutlery Works, Wazirabad whether they would take you as an apprentice

831. Satnarain Lal.—Benzoated oil is used as fixative for perfumery Benzoated oil does not affect the original scent. It will not be advisable to use peppermint oil as basis for hair oils

832. Daulat Ram Vidya Parkash Sud—For cigarettes of different brands enquire of Karim Bux & Elahie Bux Brothers, 58-4, Canning Street, Calcutta

833 B Singh—Refer your query to advertising department.

834. Mehdi Hasan—Heko brand perfumes may be supplied by D. G Gore, Sayana Bldg, Lohar Chawl, Bombay.

835. K. S Harihar Aiyer.—Shellac may be supplied by Bengal Shellac Factory, Ltd, 53-58, Ezra Street, Calcutta. Procure chemicals locally for manufacturing polish.

836 Bhagwant Singh—For catalogues of ivory goods write to Matribhandar, Srimani Market, Calcutta. For cloth enquire of Aryan Trading Co, Ludhiana. For articles of marble stone write to K. Bindra & Sons, Gokulpura and Rup Narain Jai Narain; both of Agra.

837. N K. Joshee.—Woollen goods may be supplied by Ghulam Nabi Abdul Samad, Katra Abluwalla, Amritsar and Kashmir Weaving Co., Sringar, Kashmir. For the required address write to the Registrar of Joint Stock Companies, Government Place, Calcutta.

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NEW IDEA PRIZE AWARD.

FOR VOL. XV (1924-25.)

Those of our readers who are interested in New Ideas for Small Capitalists must have noticed that lately we have been trying to put in only thoroughly new and eminently practical suggestion. No doubt there is a very large number of entries for the New Idea Competition but the majority of them in disqualified as not being feasible. We feel regret for the rejected ideas but we would naturally expect better ones from the hands of the progressive readers. Indeed with the growth of INDUSTRY we will make more and more stringent selection.

We are pleased to announce the following awards and request the winners to claim their respective prizes quoting their Subscriber No.

- 1 Mr. E Lakkaraju Naidu,
"Chemo House,"

Ice Factory Road, Kharagpur.

Rs. 10 (Two prizes.)

2. Mr. K. Varatharajulu,
C/o. Mr. K. Krishnaswamy Chetty,
Merchant.
Chandragiri.

Rs. 5 (One prize.)

3. Mr. M. Ghafur Ahmed,
C/o. Mr. Karam Bukhsohalla,
Kalal Majri, Ambala City

Rs. 5 (One prize.)

- 4 Mr. N. C. Das Gupta,
P. O. Bharadvajhat,
Chittagong.

Rs. 5 (One prize.)

In this connection we strongly commend to the notice of our readers the new ideas sent in by the following gentlemen though they have not been successful.

Messrs. Joe-Pack and Bros.
W/55 Near Police Lines.
Kamptee.

Messrs. Chohan Bros.,
Hafizabad.

NOTICES AND REVIEWS.

Patent Medicine.

• Messrs. Ramchand Teckchand and Co., Advani Lane, Hyderabad, Sind have sent us a bottle of Health Pills.

A Digestive Medicine.

We have received a phial of "Sab Hazam" from The Hydropathic Institute, Meerut. The medicine is said to help digestion.

A Vernacular Magazine.

Vyaparik Sansar is a Hindi Magazine dealing with industries and trade. It is published from Hathras, U. P.

A Hectograph.

The Hectograph manufactured by The Hectograph Company, Sarak, Gondianwala, Gujranwala may be found serviceable for printing circulars, etc.

A Business Magazine.

Viswakarma is a Hindi monthly dealing with industry and trade. It is published from Kailash Press, La Touche Road, Cawnpore. The inaugural issue contains many information and useful articles.

A Primer for Learning English.

Tandan's English Teacher. By Babu Ramnarayan Jee Tandan. Published by Messrs. Tandan Brothers, Agra City, U. P. Pp. 256. Price Re. 1 only.

This is a very useful Anglo-Hindi manual for acquiring efficiency in the English language through the medium of the vernacular and without the help of a teacher. The instructions are easy to follow and the arrangement of the subject matter is satisfactory. It comprises lessons on both Grammar and Translation.

A Trade Journal.

Industry and Trade. A monthly Anglo-Vernacular Magazine to encourage industry and push forward trade. It is published from 429 McLeod Road, Karachi.

An Interesting Booklet.

Lightning Calculations and Novel Memory Tricks. By Satya Ranjan Ray, Jubbulpore, C. P. Price As 8 only. Pages 38.

This little book contains interesting accounts of mathematical prodigies and some easy hints by memorising which intricate problems may be solved instantly.

Toilet Articles.

We have used with satisfaction Taral Alta (rouge for the feet) and Boot Cream prepared by Oriental Industrial Co., 16 Bonfields Lane, Calcutta; the first named product gives an indelible tinge while the second makes the leather soft and supple.

A Manual on Typewriting.

Typewriter Manual. By Y. Narayan, Proprietor of Typewriter Supply Agency, 364 Esplanade Row, George Town, Madras. Price Rs. 3 now offered at Rs. 2 nett Pages 76.

The book under review presents in a very comprehensive manner everything that is worth knowing in relation to typewriting. Starting with the definition of a typewriter it traverses the whole range comprising its history, utility, use, keyboard, etc. There are practical lessons on the mechanism, handling and repair together with typical questions. Needless to say that being copiously illustrated the subject is easy of comprehension. Altogether it is a very valuable publication and unique of its kind in India too.

A Benevolent Society.

At the Cow Protection Conference held at Belgaum in December 1924 a scheme for the formation of a permanent All-India Cow Protection Organisation was mooted with the object of protecting the cow and her progeny by all moral means. Its office address is 75 Mahabir Building, Homji Street Circle, Bombay 1.

Vermicelli Making Machine.

It is rarely that we come across an improved hand-machine for domestic use in this country. We are therefore extremely delighted to commend to the notice of our readers the Vermicelli making machine made by the General Supplying Agency, Bhopal C I. To all appearances it will be a very useful utensil to those who have to prepare vermicelli in bulk.

A Book on Eugenics.

The Secret of Sexual Bliss. Published by Messrs P K Vinayaga Mudaliar & Co., Sowcarpet, Madras. Page 256. Price Re 1 only.

Some idea of the wide range traversed by this manual may be gauged from the subjects treated, viz., Human body and its organs, development and health, diseases and remedies, psychology of love and passion, pregnancy and child birth, diet and drink, etc.

A Book on Hydropathy.

Hydropathy or water-cure in Bengali by Babu Rakhal Chandra Chatterjee, B.L., 20A, Kali Prasad Chackravarty Street, Calcutta, in two vols. Price Re. 1-4 each vol.

This book as the name implies is a book of treatment by means of water in Bengali. It is a small book written on the lines of German nationalist or nature-curer Kunhe, Jost and others. It will remove a great want hitherto in Bengali literature for those who know no other language in bringing to their doors a cheaper and at the same time efficient mode of treatment without taxing their intelligence and mastering the technicalities. Such

books are really a great boon to the suffering humanity. We must thank Rakhal Babu for his work as besides practising his own profession as a lawyer he found time and energy to devote to pursuits of such a nature as medical which is rather a technical and tough subject. The book has a great future before it, should it be given a fair trial on a scientific basis along with other lines of treatment already in the field. The object of treatment must be everywhere the same i.e. to relieve the suffering humanity even if we cannot cure and there should be no narrowness or short-sightedness about the matter. An earnest worker is he who holds always a broad and open outlook in everything that is scientific. In him there should be no party feeling or abusing of this system or that system of treatment. We do not agree with Rakhal Babu when he says that this is the only kind of treatment which ensures perfect recovery from all and every sort of disease and that every disease is the result of fever. Neither the physiology nor the pathology can or will ever testify the same. He and other workers on this line find and try to find divergences and lines of demarcation between different modes of treatment. We, on the other hand, hold quite a different view on the point. We believe in the harmony of different treatments and there must be only one principle which links them together. Nature is trying so far to find out the most easy system of treatment involving cure or relief as the case may be on its own lines and science hunts up the book of nature page after page to see where it could find such a cure. It is not hydropathy, allopathy, homoeopathy or any 'pathy' that could alone do it. It is the essence of these different 'pathies' and combinations of the best principles in all which would give relief to suffering humanity in a new form and in a completely new way. It only requires an open scientific mind to work out this problem.

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Trade Enquiries.

[To communicate with any party write him direct with name and address as given below.]

614 Sarat Chandra Ray Chowdhury, 5|C Nebu Bagan Lane, Bagh Bazar, Calcutta.—Wants agents for automatic warping machine for handloom patented by him.

639. R. N. Wahi & Co., B. Mohalla, Quetta.—Want addresses of castor oil mills of Northern India.

649. I. D. Pandoty, Setanfalia Street, Surat.—Wants to buy cardigan textile colour transfers.

668. Moti Lall Singh C/o. B. Ramgolam Singh, Asansol, E. I. Railway.—Can supply gunny garters in very large quantity.

673. Sant Singh C/o. The Lion Brand Safety Match Factory, Jwalapur, Hardwar.—Can supply bleached match splints and veneers.

692. The Indo-British Trading Co., 3 Thambu Chetty Street, George Town, Madras.—Want to be put in touch with horn article manufacturers.

724. Maung Thin, Zingyaik, Burma.—Wants to be introduced to bird and fancy pigeon dealers at Calcutta.

742. Albert Martis and Co., Church Gate Bldg, Hampankatta, Mangalore.—A sculptor wants to learn the western art. Will any one help him?

747. Rupendra Narain Ray, Gouripur, Assam.—Wants to be put in touch with dealers in 'valti' leaves.

750. S. Kasinathan, Darlay Lane, Colombo.—Is willing to buy Velambur sangu.

759. Amar Nath Datta, Haripur No. 624, Lyallpur, Punjab.—Wants to be introduced to the inventor of self propeking pankha.

763. Shaikh Peermohamed Yarmohamed, Dariapur Abdulryak's Roza, Ahmedabad.—Wants to be put in touch with dealers in second-hand dhooties and saris of Calcutta.

777. Amrit Lall Howsa Patel, Kota, Bilaspur.—Wants to be introduced to match manufacturers from bamboos.

786. Janki Das, Murree.—A Punjabee graduate stenographer wants to go abroad to undergo commercial training. Will any one help him?

794. Faridabad Myrtle Supply Co., 498 Gandhi Gali, Delhi.—Can supply myrtle in very large quantities.

796. S. M. Abdulkhader Sahib, 107 Moor Street, Mannady, Madras.—Can supply fish amber.

798. M. Pannagashayee, 3 Mosque Street, Triplicane, Madras.—Wants to be put in touch with suppliers of lion's fat and bear's fat.

857. Balikrishna Hari Naik, Nova Goa, Portuguese India.—Wants to be put in touch with exporters of fire crackers from Canton in China.

868. Bagisvaridatta Upadhyaya, Dodhi-chasram, Chapra, B. N. W. Railway.—Wants to buy Brazil wood, red carmine, campeachy wood, cochineal wood and pervambuco wood.

875. Checka R. Jam, Cocanada.—Can supply mango pulp.

877 M. S. Subbanarasiah, Madura East Railway Station, S. I. Railway.—Is willing to buy orris root, alibanum and isinglass.

882. Amar Das, Tehsil Bazar, Kohat.—Is desirous of buying odourless groundnut oil.

886. V. Olaganathan, Kulasekharapatnam, Camp Palamooth.—Has got a landed property which he intends to utilise for starting agricultural farm. Will any one help him with money?

INDUSTRY

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At the time of sending a V.P.P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V.P.P. For particulars and Advt. rate please write to—

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VOL XVI.

CALCUTTA, JULY, 1925

NO. 184

THE PROGRESSIVE MOVE.

I CONGRATULATE you for the new features particularly the illustrations you have brought in to improve INDUSTRY. I am a reader of eleven years' standing and wait for my copy of INDUSTRY month after month with wistful eyes. I had to watch its decadence during the war period and am watching its rapid progress since. I can assure you of a very valuable and serviceable life of INDUSTRY in the years to come if the progressive editors of INDUSTRY never fail to maintain the standard of service they have so capably established."

We cull the above from one of a shoal of letters we received since the April issue had seen the light of day. "Service—and better service is your motto indeed. The felicitous move in improving the paper, the get up and above all the serving capacity and reading features, are indeed in keeping with your idea of service and will be appreciated by all." This from another letter taken at random.

The history of the growth and development of INDUSTRY from a small beginning—an eight-page venture at Re. 1 a year only, the gradual rise of price during the war period with rather depreciation in quality and the turning point in July 1921 when INDUSTRY attained the hundredth number, and the gradual and progressive rise since in quality of the subject matter, in the increasing number of pages, in bringing in the illustrated features in the articles, in better explaining the recipe portions and in more elaborate treatment of the query letters yet without raising its price—makes an interesting reading in the field of industrial journalism in India.

We need not recapitulate all these. But we must point out the needs of the country which INDUSTRY will endeavour to serve. The monthly Vol of INDUSTRY is indeed small, but it has actually changed the course of men's lives." You can read it in an hour. That one short hour proves more than one month—an eventful month of your life. And every

INDUSTRY reader testifies to the truth of this.

INDUSTRY believes that some of our industries are capable of such improvements as to fulfil and supply certain of our needs for which we at present look to foreign achievements. INDUSTRY believes that if our intelligentsia joins the artisans, such improvements are capable of being effected in the best interest of the country. INDUSTRY believes more in the growth of our old industries on scientific lines than in supplanting them altogether by bringing in the Western factory system of manufacture with its evils, its demoralisation and the concentration of capital resulting in a never-ending tussle between capital and labour. INDUSTRY never fails to admit the utility of big concentration of capital and labour in certain cases of industrial venture but never believes in altogether killing what we have got.

Thus INDUSTRY wants to join the educated aspirants with hardy artisans;—but our educated folk are crying for employment, and the artisans—yes, they are poverty-stricken and starving being unable to effect the sales of their products in the face of foreign competition. The intelligentsia must come to the rescue of the unlettered, they must know their wants and privations, they must study their ways and methods, standardise them on scientific basis, give them all the benefit of their culture

and make every endeavour to bring them up to the standard of their own life, of their own culture, of their own education, living and thinking.

INDUSTRY invites its readers—among whom you certainly are one—to have a heart-to-heart thinking over this matter of vital interest to the country. Every issue of INDUSTRY, ever more than its predecessor, is intended to give you fresh strength, firmer purpose for all things vital,—new real vigour of mind and spirit; a surer, more buoyant belief in yourself that will stay with you for ever to enable you to be something, to communicate your buoyancy to your fellow men instilling into them a purpose to serve the country to the best of their ability.

INDUSTRY wants to know you—your hopes and ambitions—and wants you to know it—its methods and teachings. INDUSTRY wants you to sit right down and write to it fully and faithfully about your plans and prospects—your hopes and ambitions, your doubts and difficulties; write to it how you expect INDUSTRY to help you more, support you more and advise you more. We feel you will never be sorry you did it—possibly that may change the course of your whole life—who knows?—for better thing. Search your heart and write to-day for to-day is better than to-morrow.

CERAMIC INDUSTRIES.

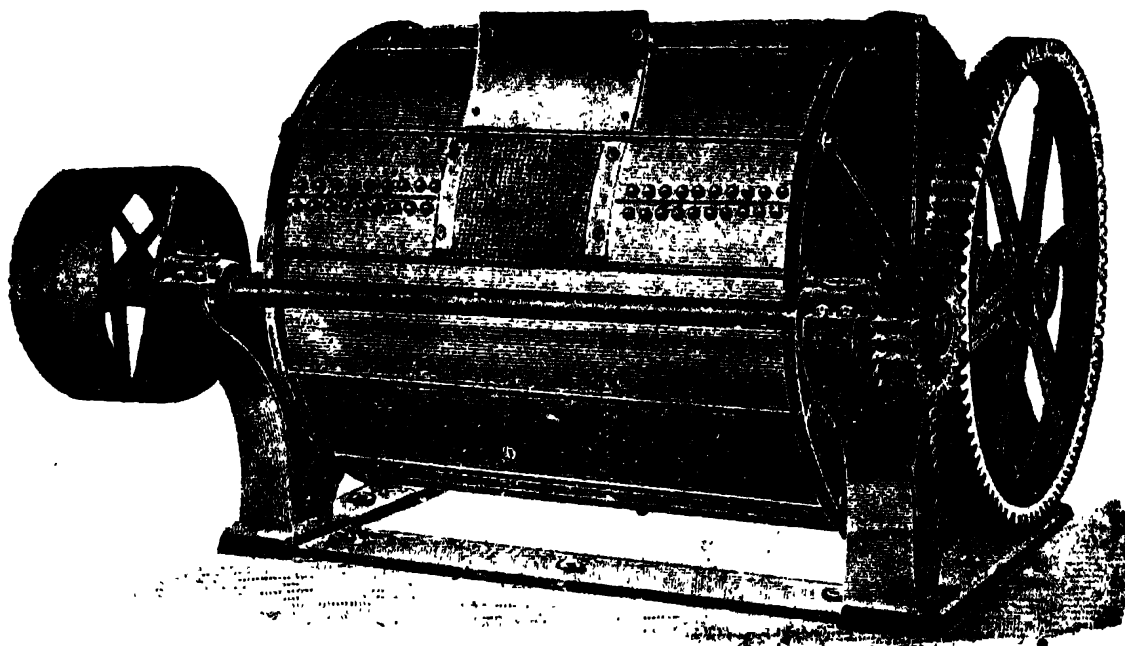


Fig. 1. Cylinder Mill.

PRODUCTION of glazed light red or brown or chocolate-coloured articles—generally known as Rockingham ware—with ordinary clay, such as found in the Ganges silt deposits or which are very often found in digging tanks, foundations and wells in Bengal.

INTRODUCTION.

From very early times India has been producing various kinds of Pots and Pans of various shapes and designs. The large-sized water pitchers (Jalas) and cooking pots (Handis) have been the objects of admiration and wonder in various international exhibitions. But it is a matter of great regret that while our artisans and craftsmen have been able to show great skill of their hands in producing such articles, they have not been able to acquire knowledge and skill enough to make mixture of clay and other raw

materials so as to produce semivitrified articles and also they entirely lack in their knowledge in putting a glassy coating usually called the glaze on their production. In this article I propose to deal very briefly with the most common materials that may be used in the production of common red ware glazed pottery—which have a great demand in the market—such as Teapots, Inkpots, Spitoons, Rockingham Bowls, Flower vases and Flower Pots and other articles of this type, their various methods of manufacture and the production and application of the glassy coating, i.e., the glaze.

RAW MATERIALS.

In common redware pottery, clay and common sand, are the two essential materials. In the neighbouring places, round about Calcutta, the Ganges silt deposit is the most suitable

clay for this purpose. The sand that is generally used for common building purposes, i.e., either Magra or Amta sand will serve our purpose. The quantity of sand and clay that has got to be mixed in producing the right kind of ware depends on the quality of the clay, i.e., its plasticity. The more a clay is plastic the more sand it will like to give it the right consistency. If the right amount of sand is not mixed with the clay, and if the mixture is very plastic, it will not be able to stand

the temperature which will be required to put the glassy coating on the ware, and mostly it will get warped. So the right amount of sand that a given clay will take must be ascertained by making certain experiments. Generally the Ganges silt will take about 25 to 30 per cent. of sand. Sometimes a little quantity of Felspar—say, 3 to 5 per cent. will improve the tone and ring of the ware produced, i.e., it will give toughness to the articles.

GRINDING AND MIXING.

Now when the respective raw materials are obtained—and after their proportions have been decided upon—the next operation consists in grinding, mixing and blending the component raw materials. This part of the operation is very important. The materials must be well ground and well mixed. This is done, by weighing the different component materials, in the dry state—and then placing them in a cylinder mill (Fig. 1) in which there are some flint and pebbles. Then the whole cylinder is filled with certain amount of water, so that the mixture may assume a creamy appearance.

The cylinder is only a cast iron cylinder (not necessary lined with porcelain—it is not necessary in the case of red-ware—for the iron of the cylinder does no harm) resting on two pivots with toothed wheel arrangements and attached to fixed and loose pulleys; and connected with the main shaft.

The time generally required to get the mixture well mixed and well ground is usually 48 hours. Then the mixture is ready for manufacture by the slip

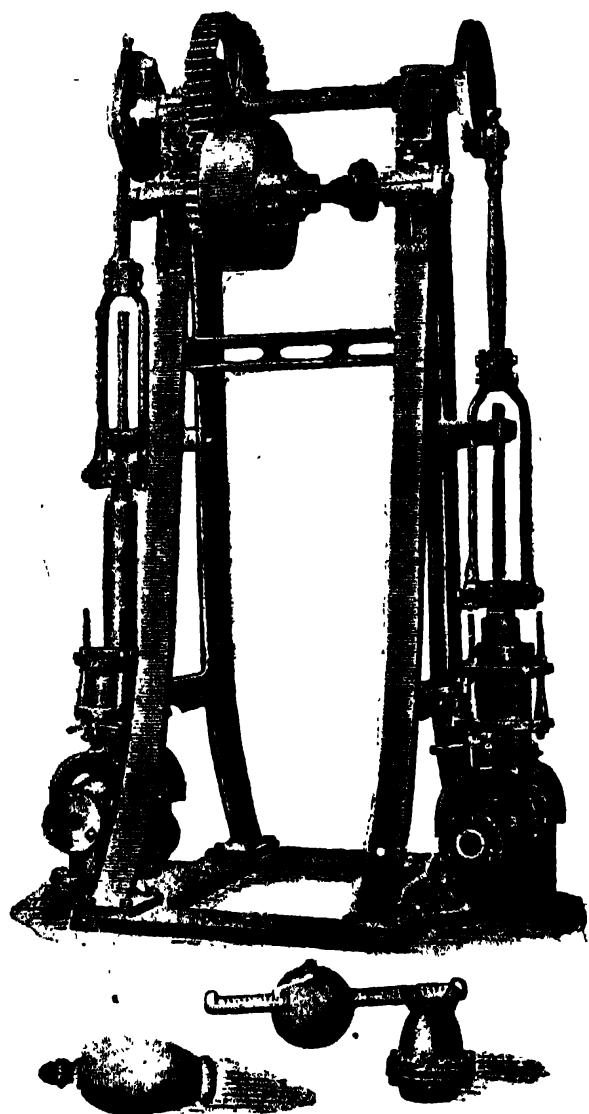


Fig. 2. Slip Pump.

casting process. So some portion of this mixture is kept for this process of manufacture and the balance passed through a filter press (a sketch of which is also shown) by means of a slip-pump. Thus dried cakes of mixture is obtained—which are then passed through the Pug mill—and the clay is ready for manufacture by the throwing method on the Potter's wheel, in which method—our artisans and craftsmen i.e., the Kumars—are very well efficient.

METHODS OF MANUFACTURE

(1) (a). Throwing on potter's wheel.

(b). Jiggering for making bowls and cups.

(2) Casting in moulds.

(a) *Throwing*.—This method is so well known and well spread in our country that any description of this is quite unnecessary. The *Kumar*, by means of clever manipulation of his hands, can turn out various kinds of wares, of various shapes and designs.

It is a matter of great wonder also to look at a clever workman turning out vast quantities of articles (in which he has acquired experience) in comparatively so short time that it can challenge competition with any wooden machinery. This is the cheapest method of manufacture.

Jiggering and Jolley. This is throwing and casting combined so to speak. The method is very seldom used in red ware pottery—except in making bowls. As this machine is generally known as the cup and saucer and plate making machine and as red cups and saucers and plates have no demand in the market this method is very seldom used.

Casting.—This method is very generally used in red pottery. Almost all kinds of articles can be made by this method—specially those with artistic designs on the outer surface. Tea pots, inkpots, spittoons, flower pots, flower vases, indeed almost any article can be

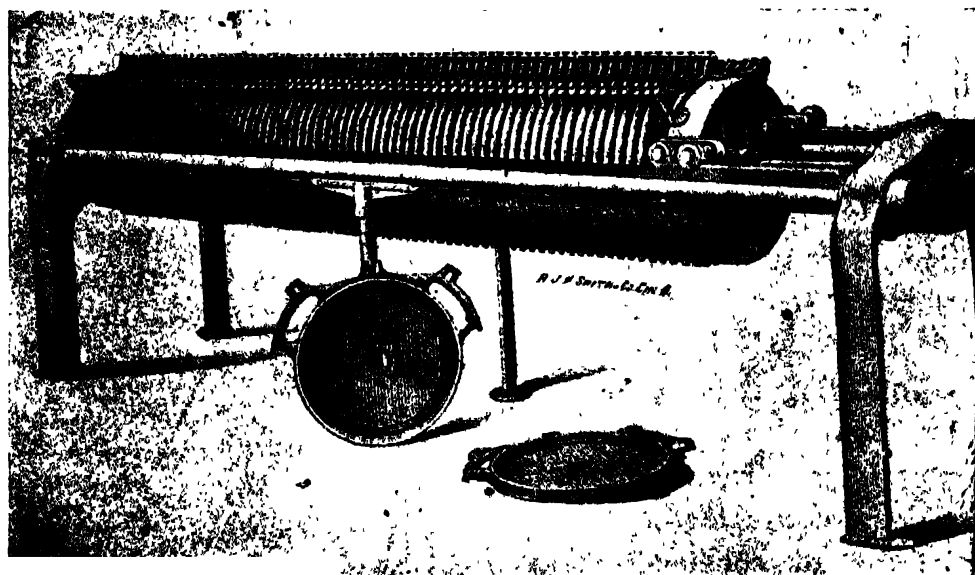


Fig. 3. Filter Press.

made by this process. This process is nothing but pouring the slip, (in which a little quantity of soda ash has been added to permit of its being taken off easily from the mould, the usual amount being about 4 to 5 per cent.) in a plaster of Paris mould, and allowing it to stand a few minutes, and when a sufficient thickness has been deposited, to pour the liquid out from the mould, and allowing the mould to get dry. Then when it is dry, the mould is opened and the ware slips out easily from the mould. Every mould can be used in this way—3 or 4 times every day. The advantage of this method is that no expert labour is necessary, even a cooly can work it; the vases turned out are uniform in size and make. But it is a little more costly than the throwing method as it requires the use of plaster moulds for which depreciation must be taken into account. After the wares have been made by the different methods described above they are allowed to dry. When they are dry the next operation consists in burning the wares and putting the glaze on. These require two different operations and require two separate firings, viz., (1) Biscuiting: (2) glaze firing.

Initial Firing or Biscuiting, as it is generally called, is done in kilns, mostly in up draft kilns—The usual practice is to use up draft instead of down draft kilns, for the following reasons:—

(1) The temperature required is not so high as is required in white ware pottery or porcelain factory.

(2) Initial cost of constructions is less in comparison with down draft kiln.

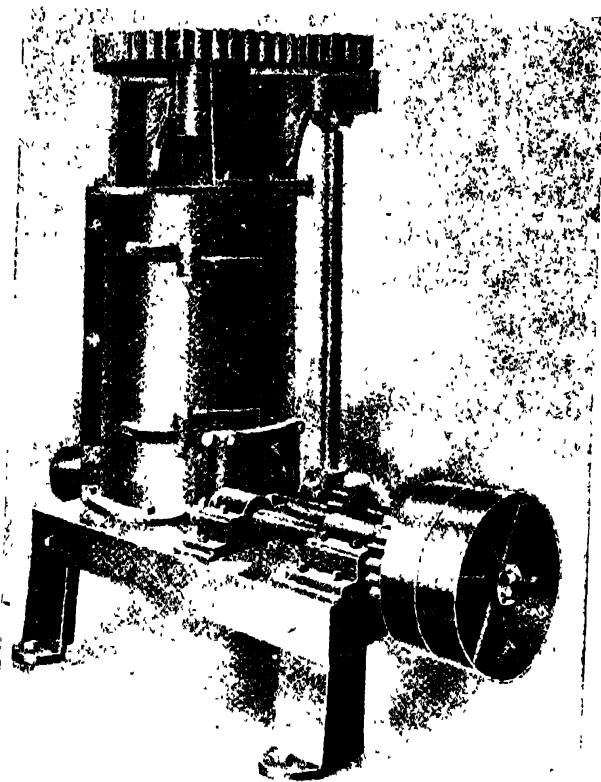


Fig. 4. Pug Mill.

(3) Easier to handle and control the fire and consequently less chance of risk.

It is not easy to deal with the construction of a regular kiln in an article of this sort to but suffice it to say that the kilns are generally bottle-shaped, the diameter of the base varies, but is generally 16 feet; with 8 or 9 fire boxes.

The wares to be burned are placed in saggars, (Fire clay boxes usual size being 1'x1'x6") and the saggars are arranged in rows of 28 to 30 high. The firing generally lasts for 18 to 24 hours. The finishing temperature of the furnace is generally between 1000—1050 C. For measuring the temperature of the furnace seger cones are used. These cones are made of chemical mixtures

and each have definite melting points. Each one is numbered—according to the temperature at which it melts. Thus—cone—010, 09, 08, 07 and so on.

GLAZING.

Preparation of the Glaze. Glaze is a mixture of chemical in which red or white lead is the principal ingredient. The other components are silica, Felspar, lime in pure state, say marble, a little pure clay. The following is a typical formula of a Rockingham glaze:—

Plumbic oxide 0.77.

Calcium oxide 0.08.

Potassium oxide 0.15.

Alumina 0.15.

Silica 1.5.

in which lead was introduced as white lead, calcium oxide was introduced as marble; potassium oxide was obtained from the felspar; alumina was obtained some from clay and some from felspar; and the balance silica was introduced as quartz. Sometimes a little iron is add-

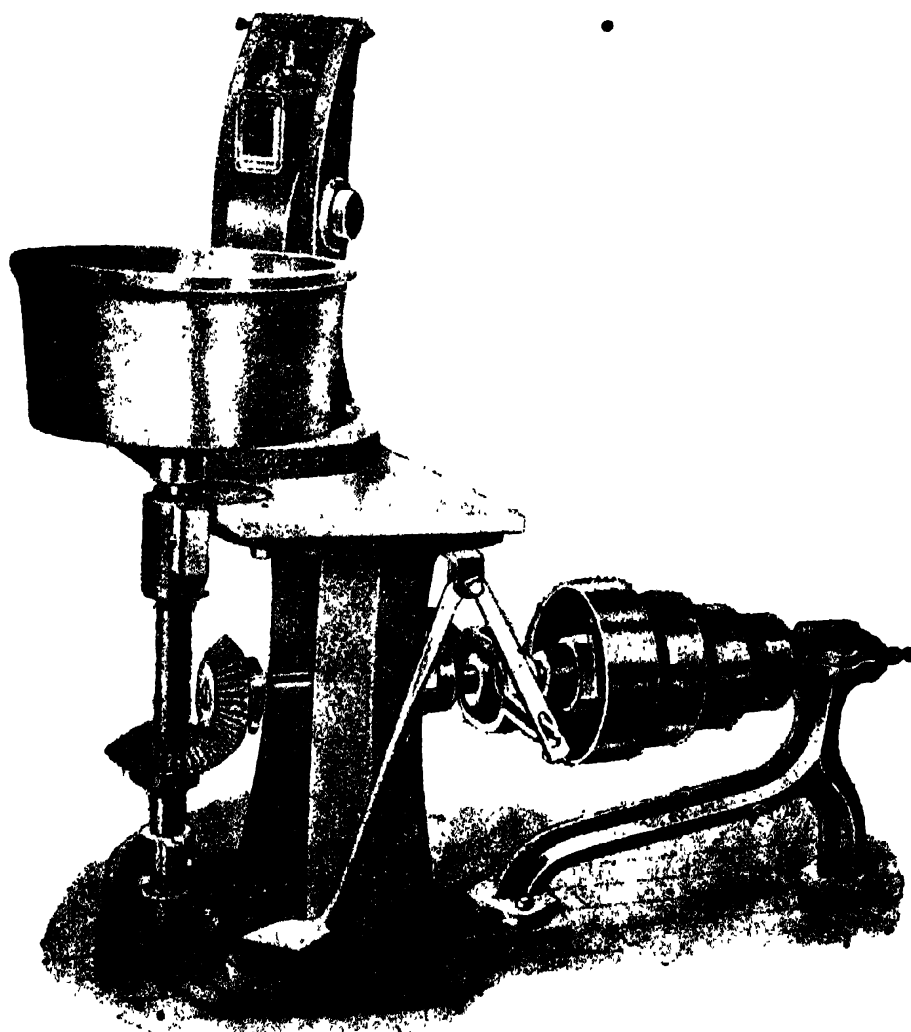


Fig. 5. Jigger and Jolley.

ed in the form of ferric oxide to help preserve the red colour of the body, otherwise the glaze has a tendency to rob some iron of the body—and thus decolorise it. Sometime a little manganese in the oxide form is added to give a tone to the colour of the body.

Having got the different materials in a pulverised form in a dry grinder, the whole is introduced in a porcelain lined cylinder, usually known as the glaze mill. This cylinder is just about the same (previously described) as used for the mixing of the body mixture. This is ground for about 72 hrs. The more a glaze is intimately mixed and ground, the better the results obtained. To test whether a glaze is well mixed take a small quantity in between your two thumbs, and rub, if it is impalpable it is all right.

Application of the glaze to the body.—

There are various methods by which the glaze is applied to the body, viz., Dipping, dusting, spraying, sponging, sprinkling, volatilization, etc. But as dipping is the method most extensively used in Rockingham ware pottery this method alone will be considered.

Dipping is simply immersion in the glaze liquid. Though this method is very simple, the process requires some precautions to be taken, otherwise the wares turned out will be defective.

Precautions—(1) That the glaze is of the right consistency, not too thick nor too thin. If too thick—the glaze will flow much and if too thin—the glaze will be absorbed by the body.

(2) The ware should on no account be immersed twice. It makes the glaze liable to be peeled off from the body.

(3) The finger marks etc., are to be covered with glaze liquid (when the body is dry) by means of a small brush.

Good dipping is very important, and it requires long experience to dip very class of piece with equal success. It is always better to engage some dippers for dipping the wares, employing different sets for different wares. As dipping is the most important part of the operation, in order to be able to obtain good results, it requires elaborate description, which an article of this nature will not permit to do.

After the glazed pieces have been perfectly dried, they are arranged in saggers by means of stills, thimbles spurs and saddles, according to the requirement of the pieces. To manufacture the stills, spurs, etc., and to arrange them with the bodies in saggers is a subject in itself which may be dealt with in a future article.

BURNING.

After the bodies have been arranged in saggers they are arranged in pile—as they were done while biscuit placing. The glaze for which the formula has been given previously will mature at between 950 to 1,000 deg. C. The temperature is measured by means of seger cones as described previously. It is very important that all along, the fire of the kiln must be oxidising, as the reducing temperature has very deleterious effect on the wares. The time generally required for glaze firing is 18 hrs. At the end of the fire care should be taken as soon as the required temperature is obtained, to draw out the unburned part of the fuel and close the door of the fire box and the dampers in order to maintain the right temperature for some time. The time required for cooling is usually two days; when it is cooled, the saggers are taken out.

—BY A CERAMIC EXPERT.

THE ART OF GLASS BLOWING—IV.

BLOWING BULBS AND FLASKS.

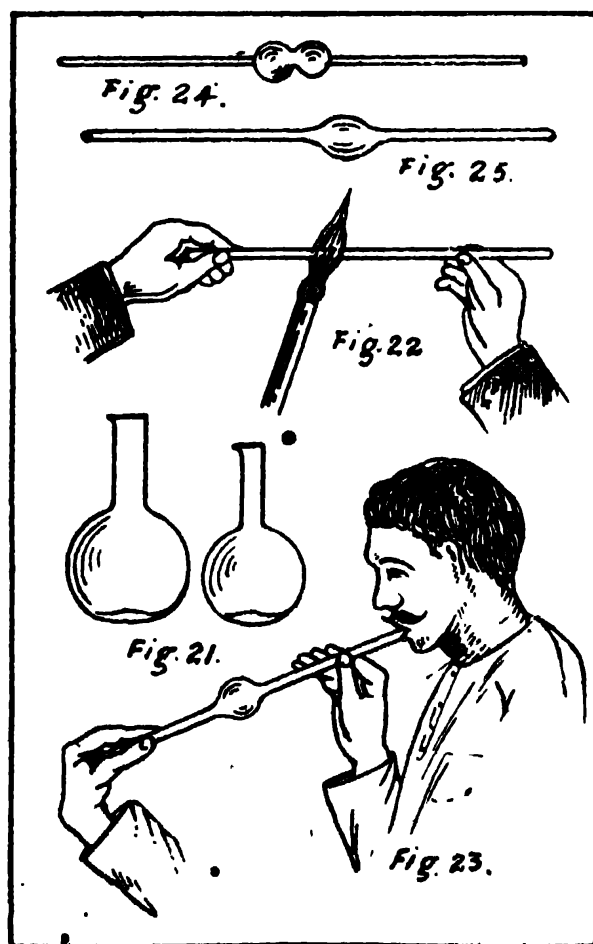
TO MAKE a small flask, choose a portion of the 3/16 in tube 8 in. long hold it in a slanting position (Fig. 9) in the large blowpipe flame, and as soon as the end has closed and the lump of pasty glass collected, withdraw from the flame, and blow a small bulb about 1/2 in. diameter upon the end (Fig. 10). Hold the tube again in the flame, this time in a horizontal position (Fig. 11) and heat it at a point just beyond the bulb first blown, rotate the tube between the thumb and first three fingers of the right hand. When the heated part of the

tube is sufficiently softened, again withdraw, and blow a second small bulb similar to and alongside the first one. (Fig. 12).

Replace the tube in the flame and heat both the bulbs at the same time; they will gradually fall together into one elongated or pear-shaped bulb (Fig. 13). Proceed to get this bulb at a bright red heat, and rotate rather quickly, or it will fall too much to one side. Remove from the flame, place the tube in the mouth, and blow very gently; rotate the tube backward and forward as the bulb falls so as to keep it exactly on the centre of the tube; gradually increase the blowing as the glass cools, until finally a perfectly spherical bulb about 1 1/2 in. results if proper care has been taken. (Fig. 14).

In order to make the bulb sufficiently strong to make it serviceable, it is necessary that a fair amount of melted glass should be produced upon the tube, and that is the reason for blowing two bulbs and fusing them into one. True, that a bulb might have been blown from the first one, but then it would have been too thin for ordinary purposes.

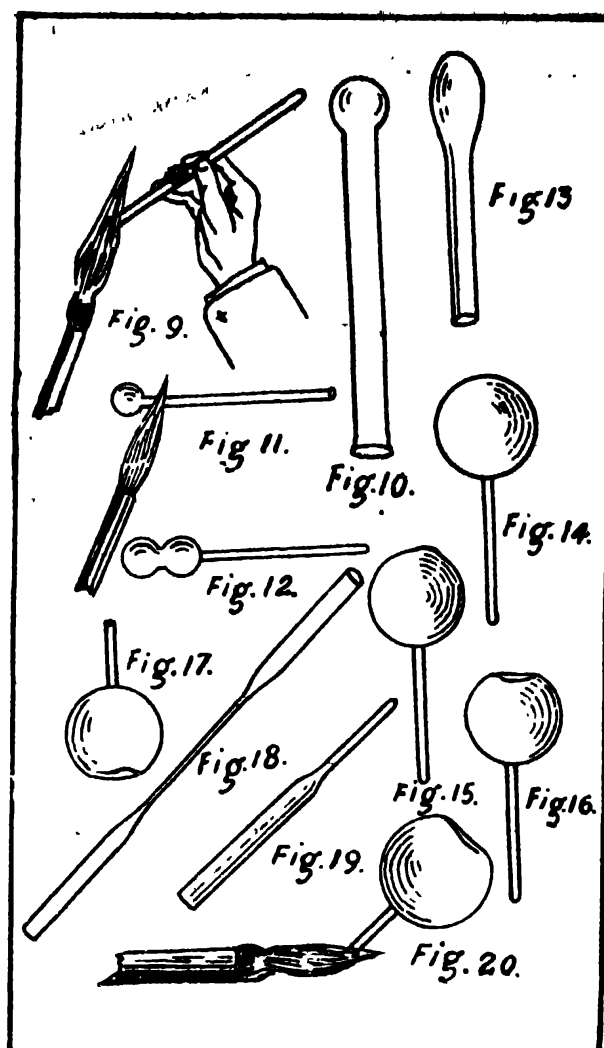
Now turn down the flame to about half the usual height, and hold the bulb in the outer edge of it so that only the extreme bottom is heated. The tube should be in a horizontal position. Rotate it rather quickly when the bottom will fall in perfectly flat. Remove from the flame and blow it out slightly (Fig. 15), then as quickly suck inwards. The bottom will then appear as in Fig. 16.



The flask may then be severed from the tube. (Fig. 17).

To make larger flasks than these, choose a piece of $\frac{1}{2}$ in. tube, 12 in. long, hold it in the large flame, rotate, and as soon as it is soft enough, draw out to a fine tube about 8 in. or 10 in. long. In drawing this tube, endeavour to get it of an even thickness throughout and perfectly straight (Fig. 18). Hold the finer portion in the flame and draw the two ends away, thus forming two similar tubes (Fig. 19). When these have cooled, take up one of them, break the pointed end, then hold it in the large flame in the position shown in Fig. 9; rotate it, and as soon as the end has closed up and sufficient glass collected, blow a small bulb upon it, hold the tube in a horizontal position, and bring it again into the flame at the point shown in Fig. 11. Rotate until hot enough, again remove and blow a second bulb similar to the first; replace the tube a third time in the flame, heat it a little beyond the second bulb, remove, and blow still another bulb.

Now proceed to fuse the three bulbs into one, and in order to do this satisfactorily some amount of practice and patience will be required. Heat the tube so that the two first bulbs become red hot; they will gradually lose their shape and fall into one elongated bulb; rotate the tube carefully so that the tendency of the hot glass to fall may be obviated. As soon as the glass is soft enough, remove from the flame and blow the bulb into a sphere; this must be done carefully so that the diameter of it may not be more than 1 in. Having now only two bulbs upon the tube, melt the third



one into the first one in the same manner. There being more glass upon the end of the tube the tendency to fall will now be greater, and the glass must therefore be very carefully rotated to prevent this. Remove the tube from the flame and again blow a small bulb; this time try to get it as nearly spherical as possible, and upon the centre of the tube. Place the bulb again in the flame until sufficiently red hot, remove, and blow out the bulb to about 3 in. diameter; this will form a round-bottomed flask. If it is intended that the flask should stand upright, the bottom may be drawn inwards exactly as

the smaller flasks were prepared. Now make a file mark upon the neck and sever it with a hot glass rod; hold the mouth of the flask in the smoky flame, gradually admit the air, and hold in the position shown in Fig. 20. As soon as the edge of the glass becomes red hot, remove from the flame and press out with a charcoal cone, forming a mouth to the flask. (Fig. 21).

PLAIN PIPETTES.

Choose a piece of the 3/16 in. tube, 12 in. long, hold it in the large flame, rotate gently until sufficiently heated, then withdraw from the flame, hold it horizontally, and draw the hands away from each other slowly with a slight twisting motion. The tube will then appear as in Fig. 18. Sever it in the centre, hold both ends of each tube in the flame to round them off, and two plain pipettes will thus result. (Fig. 19).

BULB PIPETTES.

Now take a piece of tube $\frac{1}{4}$ in. diameter and about 12 in. long, heat this in the centre, and when sufficiently softened, removed and draw out quickly; in this way a long fine tube will be obtained. Hold the fine tube a second in the flame and draw in two, sealing off each tube. Take up one of the pieces just produced, hold it in the large flame in the position shown at Fig. 22 and rotate gently. The left hand is in this case merely a support for the finer part of the tube; the latter must not be held in any way; the right hand is used for holding and rotating the tube. As soon as the tube is at a working temperature, remove it and hold it in the position shown at Fig. 23; slowly rotate with the

right hand, still using the left hand only as a rest, and blow a small bulb upon the tube of about $\frac{1}{4}$ in. diameter.

Replace the tube in the flame, holding it in the same position as before, and heat it at a point slightly higher than the bulb just blown; remove again, and blow a second bulb. (Fig. 24). Replace the tube again in the flame; this time heat up both bulbs until they fuse into one, remove, and blow a small bulb. Finally, heat this bulb, and blow out into one having a diameter of about $1\frac{1}{2}$ in. (Fig. 25). If the pointed end of this be broken, it will then be a bulb pipette.

Bulb blowing is a difficult operation. Perfect and spherical bubbles can only be obtained after much practice.

In writing an advertisement, be cautious; in displaying one be bold.

The advertisement writer's most valuable asset is faith in the thing he advertises.

The advertiser who works on the theory that people like to be humbugged humbugs himself.

To tell what advertisements should draw is easy—to write advertisements that will draw is another thing.

The man who wants to get business from advertising must have some business within himself.

Advertising is educative. Advertising should not be looked upon as an expense, but a very necessary investment.

THE PROCESS OF DISTILLATION.

THE term "Distillation" designates a class of chemical operations the essential features of which are described below. The substance operated upon is heated in a close vessel (the retort), and thereby wholly or partially converted into vapour, which vapour is then condensed, by the application of cold, in another apparatus (the condenser) connected with the vessel, and allowed to collect in a third portion of the apparatus called a receiver. Generally the substance is a liquid, and the product obtained (the distillate) is also in greater proportion liquid. The comparatively few and special cases of distillation wherein solids are converted into vapours which condense directly from the gaseous into the solid form, are designated sublimations. We may cite as examples (1) distillation of water and (2) sublimation of camphor.

Distillation may be divided into two classes, (1) those which are not and (2) those which are accompanied by

chemical change. Dry distillation is a term applied to the distillation of substances *per se*, or without the addition of water or other volatile liquid. Destructive distillation is the distillation of substances at temperatures sufficiently high to decompose them, by which their elements are separated, or evolved in new combinations. Fractional distillation is the separation of substances having different boiling-points, by distilling the mixture at a gradually increasing temperature, and collecting the products which come over at different temperatures in separate receivers.

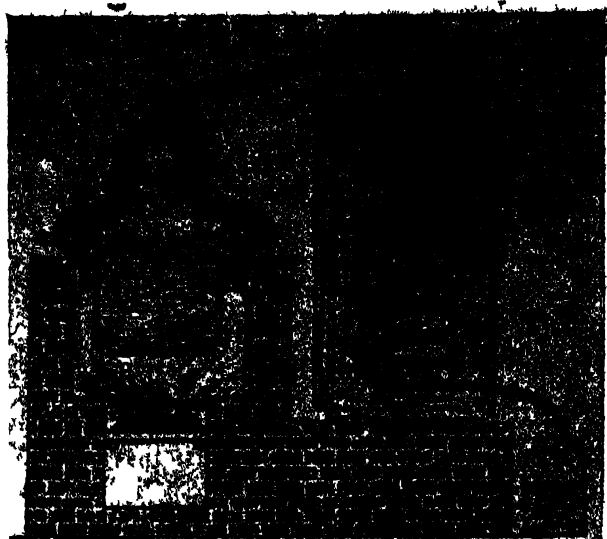
The general object of simple distillation is to separate one substance from others of different degrees of volatility with which it may be mixed. For the successful performance of the process the substances to be separated should differ so greatly in their volatility that one can be assumed to be non-volatile at the boiling point of the other. The distillation of water affords an illustration. A sample of natural water usually consists of three parts: (a) water proper, (b) non-volatile salts, (c) dissolved gases.

To obtain pure water from such material, we only boil it in a distillation apparatus, so as to raise from it dry steam, which steam when condensed yields water contaminated only with the gases. To expel these, all that is necessary is to again boil it for a short time; the gases go off with the first portions of steam, so that the residue, when allowed to cool in absence of air, constitutes pure



Fig. 1. Laboratory Still.

water. In the distillation of two substances of approximately equal molecular weight and latent heats of vaporization, supposing neither to predominate overwhelmingly over the other, the one with the lower boiling point will predominate in the early, and the other will gradually accumulate in the later, fractions of the distillate. And similarly with mixture of three or more bodies. The further the respective boiling points are removed from one another the more complete a separation can be effected; but in no case is the separation perfect. It is, however, easily seen that the analytic effect of a distillation can be increased by causing the vapour, before it reaches the condenser, to undergo partial condensation, when naturally the less volatile parts chiefly will run back. The simplest mode of attaining this is to let the vapour ascent through a long vertical tube before it reaches the condenser, and to distil so slowly that a sufficiently large fraction of the vapour originally formed fails to survive the ascent through the cooling influence of the atmosphere. A more effective method is to let the condensed vapour accumulate in a series of small receptacles inserted between flask and chamber, constructed so that the vapour cannot pass through the receptacles without bubbling through their liquid contents, and so that the liquid in the receptacles cannot rise above a certain level, the excess flowing back into the next lower receptacle or into the still. But the most effective method is to let the vapour ascend through a slanting condenser kept by means of a bath at a certain temperature, which is con-



• Fig. 2. Distilling Apparatus.

trolled so that while the liquid in the flask boils rapidly, the distillation only just progresses and no more. •

As the preparation of alcoholic spirit is the most important industry in which the operation of distillation occupies a prominent place, the establishments in which the manufacture is conducted are known as distilleries. But there are many other important industries in which distillation is essentially employed for separation, purification, or concentration of various products. A large proportion of the essential oils are, for example, obtained by the distillation of the substances containing them from water, or a mixture of salt and water.

Advertising is the locomotive of business. To stop advertising is therefore just like taking the engine off a train.

Advertising is the greatest factor in increasing the demand for an article and so increasing turnover. Advertising creates mass production and mass selling which reduces selling and other costs.

PREPARATION OF NATURAL COLOURS.

(By a Practical Expert.)

IN SPITE of the fact that the universal application of artificial dyestuffs has relegated to oblivion the natural colours, there is and always will be a genuine demand for the latter because of their intrinsic worth though the former may remain for ever cheap. Indeed it has been admitted even by European authors that aniline and alizarine dyes can in no way serve the purpose in case of certain delicate tinges which can be developed only with natural colours. Even as it is, indigenous dyes are actually in vogue in many parts of this country where the womenfolk prepare them at home and dye their *saries*, etc. We proceed to describe the preparation of a few important colours. The general procedure is as follows.

The raw materials are pulverised and digested in water over fire. Sometimes they are previously soaked or steeped. The decoction is thickened by boiling down and fixatives added to it. After removal it is evaporated to dryness in the sun or open air. The cake of colour thus obtained is ground finely and the powder packeted.

The water employed for the purpose may be preferably rain water and the vessel used should be earthenware. Black colours may be prepared in iron pan. The evaporation may be effected in shallow porcelain dishes. The dye-woods should be first reduced to chips: the flower stems, barks, etc. pounded, the stones of the gall nuts etc., rejected, and the fixatives ground to powder. Lastly

arrow-root is mixed to thicken the liquid and help formation of the cake. The Bombay variety being cheap should be used.

In India the nomenclature of some of the dye-stuffs at least is empirical and presents a fascinating subject. After the enumeration of the primary and secondary colours in the usual course their various shades derive their names from well-known objects in nature whose distinctive tints they are found to match.

RED.

Brazil wood	1 sr.
Water	5 srs.
Alum	$\frac{1}{2}$ poa.
Gum	1 ch.

Digest the wood in water in an earthenware vessel over fire until the water is reduced by half. Then add alum and continue boiling. When the decoction is only $1\frac{1}{2}$ sr. mix in the gum. Remove when only $\frac{1}{2}$ sr. is left and allow to evaporate on a shallow, porcelain basin. Powder when dry.

SCARLET.

Laha	1 sr.
Water	6 srs.
Alum	$\frac{1}{2}$ poa.
Milk of Green Coconut	1 poa.

First bring to boil the water and throw in the *laha* powder. Continue boiling and when the liquid is reduced to half stir in alum. The colour will now be considerably brightened. When only 1 sr. of the decoction is left mix in the coconut milk. Remove when only half seer is left, strain and evaporate. Powder when dry.

PINK.

Brazil wood	4 srs.
Lodh wood	1 sr.
Water	12½ srs.
Alum	½ poa.
Bombay Arrowroot	½ sr.

Bring to boil the water and throw in the woods. When the liquid is reduced to 3 srs. stir in the alum. The colour will at once brighten up. Take away when only 1 sr. is left. Strain and add arrowroot. Dry in the sun and powder.

CRIMSON.

Lodh wood	1 sr.
Brazil wood	3 srs.
Water	10 srs.

Digest the woods in the water. Remove when only 1 sr. is left. Dry and powder.

VIOLET.

Black Berry	2½ srs.
Saltpetre	1 poa.
Water	2 srs.

Mash the berries and strew over the saltpetre. Set aside for 6 hours. After that digest them in boiling water. When the decoction is reduced to half, take away, dry in the sun and powder.

YELLOW.

Annatto seed	½ sr.
Soda ash (pure)	½ poa.
Water	2½ sr.
Alum	1 ch.
Gum	½ tola.

Take 2½ sr. water in an earthen vessel, dissolve soda in it and steep the seeds in the solution for 12 hours. Afterwards mash thoroughly and boil. When the liquid is reduced to half stir in the alum. When only 1 sr. is left add the gum. Remove, dry and powder.

ORANGE.

Kusum flower	1 sr.
Turmeric	1 poa.
Saffron	½ ch.
Alum	½ poa.
Gum	1 ch.
Water	10 srs.

Steep the flowers in 10 srs. water for 12 hours. Then boil the whole and when ebullition occurs throw in turmeric powder and saffron. When the liquid is reduced to 4 srs. stir in alum. When the decoction is further reduced to 2 srs. mix in gum. Take away when only 1 sr. is left. Dry and powder.

GREEN.

Annatto seed	1 sr.
Soda ash	½ poa.
Water	4 srs.
Turmeric	½ poa.
Kamela powder	1 poa.
Alum	1 ch.
Indigo	1 ch.
Bombay arrowroot	1 ch.

First dissolve soda ash in 1 sr. water and steep annatto seeds in it for 6 hours. Then mash them thoroughly. Bring to boil 4 srs. of water and when ebullition occurs throw in turmeric and pour in the mashed annatto with liquid. Continue to boil and the decoction is reduced to half, throw in "Kamela" powder and stir in alum. Remove when only 1 sr is left and strain. Add to the liquid country indigo and Bombay arrowroot. Dry in the open and powder.

BLACK.

Embellic Myrobalan	1 sr.
Beleric Myrobalan	1 sr.
Chebulic Myrobalan	1 sr.

Babla Bark	2 srs.
Ferrous sulphate	1 sr.
Bombay arrowroot	1 poa.
Water	10 srs.

• Pound the first four ingredients and put in a large iron pan. Pour over the material boiling water. Cover up and set aside for one month. After that period set the pan on fire and when the liquid is reduced to half throw in ferrous sulphate and continue boiling. Take away when only 1 sr. is left. Strain and keep in a shallow iron dish Mix in arrowroot, dry in the sun and powder the cake.

BLUE BLACK.

Gall nut	2 srs.
Ferrous sulphate	1 sr.
Black Catechu	$\frac{1}{2}$ poa.
Gum	$\frac{1}{2}$ poa.
Indigo	1 sr.
Water	10 srs.

Pound the gall nuts and put in an iron pan. Pour in warm water 10 srs. and set aside for 5 days. Set the pan over fire and when the liquid is reduced to half throw in the catechu. When only one-fourth is left throw in the sulphate and afterwards gum. Take away when 1 sr. is left and set aside for a fortnight. After that strain and mix in the indigo; dry in the open and powder finely.

GOLDEN.

Brazil wood	$\frac{1}{2}$ sr.
Lodh wood	$\frac{1}{2}$ poa.
Soda ash	$\frac{1}{2}$ poa.
Kamela powder	1 poa.
Water	4 srs.

• First soak the wooden dust in 4 srs. hot water for 4 hours. Then boil the

whole and throw in Kamela powder. Remove when only half seer is left: Dry and powder.

BROWN.

Jack-tree wood	2 sr.
Saffron	4 tolas.
Gum arabic	1 ch.
Alum	$\frac{1}{2}$ poa.
Water	16 srs.

First bring to boil the water in an earthen ware vessel, stir in alum and when it is dissolved throw in the wood. Continue boiling and when reduced to half add saffron and when reduced to a quarter add gum. Remove when only one seer is left. Dry and powder.

GREY.

Walnut shell	1 sr.
Alum	1 ch.
Gum	$\frac{1}{2}$ ch.
Water	4 srs.
Arrowroot	1 ch.

First bring to boil the water and when ebullition occurs throw in the shells. Continue boiling; when reduced to half mix the alum and when reduced to a quarter add the gum. Remove when only half seer is left. Stir in arrowroot and dry.

BLUE.

Jangal	$\frac{1}{2}$ poa.
Copper sulphate	$\frac{1}{2}$ sr.
Juice of Pati Lime	1 sr.
Sugarcane Vinegar	1 sr.
Arrowroot	1 ch.

First steep the sulphate and jangal in lime juice for a day. Then pour the vinegar and set aside for three days. Set over fire and boil. Remove

when only half seer is left; mix arrowroot and dry.

PITCH BLACK.

Gall nut	1½ sr.
Ferrous sulphate	1 sr.
Water	5 srs.
Arrowroot	½ poa.

First soak the gallnuts in water in an iron pan for 10 days. Then set it over fire. When the liquid is coloured throw in the sulphate. Remove when only 1 sr. is left and set aside for a fortnight. Strain and thicken with arrowroot. Dry and powder.

VIOLET.

Brazil wood	½ sr.
Alum	½ ch.
Sugarcane Vinegar	1½ sr.
Rain water	1½ sr.
Indigo	½ ch.

First soak the wood in vinegar for three days. Then boil and pour in rain water. When the liquid is reduced to 2 srs. stir in alum and remove when only 1 sr. is left. Mix indigo, dry in the open and powder the cake.

YELLOW.

Kamela Powder	1 poa.
Annatto seed	1 sr.
Soda ash	1 ch.
Water	4 srs.

Dissolve soda ash in water and steep the annatto seeds in the solution for three hours. Then mash the swelled seeds and set the whole over fire. When ebullition occurs throw in Kamela powder and continue boiling. When the liquid is reduced to half seer, remove, dry and powder.

ORANGE.

Brazil wood	½ sr.
Gum arabic	1 ch.
Alum	1 ch.
Annatto seeds	1 poa.
Saffron	1 tola.
Water	6 srs.
Saltpetre	½ poa.

First steep the annatto seeds in water, dissolve in it saltpetre and set aside for 4 hours. Then mash tho-

roughly and set the vessel over fire. When the liquid begins to boil throw in wood and then saffron. When it is reduced to half stir in alum and afterwards gum. Remove when 3 poas of decoction is left; strain dry and powder.

DARK RED.

Laha	1 sr.
Lime juice	1 sr.

Mix together and wait for 4 hours. Then boil, strain, dry and powder.

BLUE.

Copper sulphate	½ sr.
Lime juice	½ sr.

Mix together and wait for 4 hours. Then boil; remove when reduced to half: dry and powder.

ONION (LIGHT RED).

Brazil wood	½ sr.
Sugarcane Vinegar	2 sr.
Alum	1½ ch.

Soak the wood in vinegar and set aside for a week. Then boil the whole and remove when reduced to half. Add alum, strain, dry and powder.

KHAKI.

Brazil wood	1 sr.
Copper Sulphate	1 ch.
Arrowroot	1 ch.
Water	4 srs.

Boil the first two ingredients in water in an iron pan. Take off when only ½ sr. is left. Thicken with arrowroot and dry.

PHIROZA.

Indigo	½ sr.
Jangal (Kashmiri)	½ poa.
Copper sulphate	1 ch.
Lime juice	2 srs.

Powder the first three ingredients separately and soak the mixture of the powders in juice of "pati" lime in a porcelain bowl for 4 days. Strain, dry in the sun and powder.

ASMANI (SKY BLUE).

Kashmiri Jangal	1 poa.
Saltpetre	½ poa.
Alum	½ ch.
Bombay Arrowroot	1 ch.

Mix the first two ingredients and soak them in 1 poa water for four hours. After that bring to boil 2 srs. of water and pour in the above liquid. When the decoction is reduced to half add alum. Take off when only half seer is left, mix in Bombay arrowroot, dry in the sun and powder.

PARROT (YELLOWISH GREEN).

Annatto seed	$\frac{1}{2}$ poa.
Soda ash	$\frac{1}{2}$ ch.
Water	2 sr.
Kashmiri Jangal	$\frac{1}{2}$ ch
Bombay arrowroot	$\frac{1}{2}$ ch.

Soak the first two ingredients in 1 sr. hot water for 4 hours and then mash the mass. Bring to boil 1 sr. water and pour in the above mixture. Continue boiling and remove when only $\frac{1}{2}$ sr. is left. Then add Jangal and arrowroot; dry and powder.

CHAMPA (BRIGHT GOLD).

Ferrous sulphate	1 sr.
Water	2 srs.
Quicklime	1 tola.

Powder the sulphate and boil it in water: remove when half seer is left and add the lime when cool. Dry and powder.

MISI (BLACK).

Ferrous sulphate	1 sr.
Copper sulphate (burnt)	$\frac{1}{2}$ poa.
Water	1 sr.
Bombay arrowroot	1 ch.

Boil the sulphates in water. Remove when half seer is left. Mix arrowroot, dry and powder.

CATECHU (KHAKI).

Chebulic Myrobalan	1 sr.
Ferrous sulphate	$\frac{1}{2}$ poa.
Water	2 srs.
Alum	$\frac{1}{2}$ ch.
Bombay arrowroot	1 ch.

Bring to boil the water in an iron pan and throw in the myrobalan powder (without seed). Add the sulphate when reduced to half and after a while the alum. Remove when only half seer is left. Mix in the arrowroot, dry and powder.

SAFFLOWER.

Safflower dust	1 sr.
Water	5 srs.
Alum	$\frac{1}{2}$ ch.
Saltpetre	$\frac{1}{2}$ ch.

Digest the flower dust in water, when it is reduced to half throw in alum and afterwards saltpetre. Remove when only 1 seer is left. Mix the arrowroot, dry and powder.

SHEPHALICA (BROWN).

Shephalica flower stems	1 poa.
Saltpetre	1 tola.
Water	$\frac{1}{2}$ sr.

Mix together the floral stems and saltpetre and set aside for 6 hours. Bring the water to boil. Remove when only half is left and dry in the open. Powder finally.

GLOSSARY.

Acacia arabica—*babla*.

Brazil wood—*bakam kath*.

Catechu—*khair*.

Copper sulphate—*tuntia*.

Ferrous sulphate—*hirakash*.

Gall nut—*majuphal*.

Indigo—*nil*.

Jack Tree—*kantthal*.

Kashmiri Jangal—*jangal*.

(Mallotus philippineus).

Kashmiri Jangal—*iangal*.

(A Dye intermediary).

Lodh tree—*lodh*.

(Symplocos racemosa).

Resin of Aswatha Tree.

(Ficus religiosa)—*laha*.

Safflower—*kusum*.

Saltpetre—*sora*.

Soda ash—*sajji mati*.

Shephalica—*siuli*.

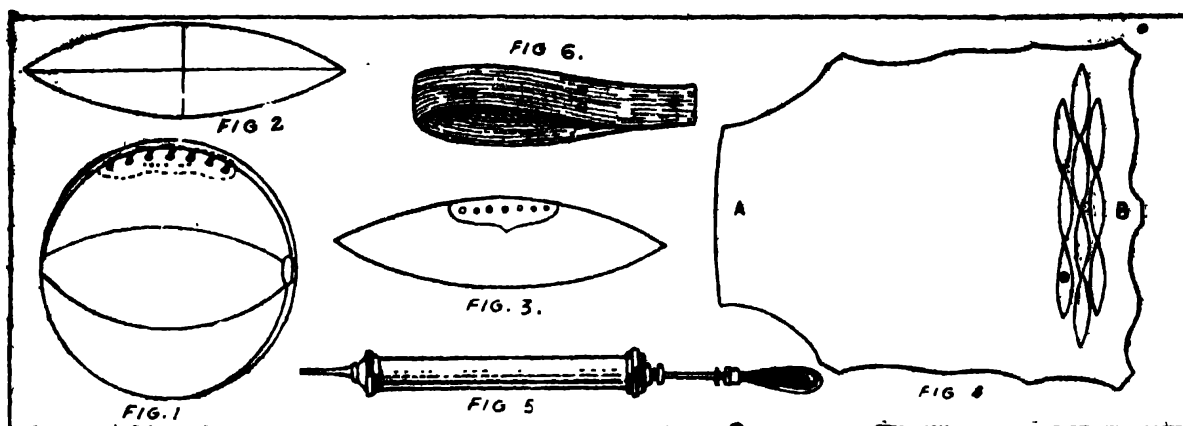
(Nyctanthes arbortristis).

Walnut—*akrol*.

1 sr.—4 poas—16 ch.—80 tolas.

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FOOT BALL—ITS MAKING.



THE composite parts that go to make a football are two in number, (1) the case, or cover, (2) the bladder. The case is made of tanned leather and bladders are made from sheet rubber, the best being vulcanised. Though the round shape is the most common, the oval shape is sometimes found, especially in England. A few types are illustrated below

Much depends on the kind of leather to be used. Football cases are manufactured from quite a variety of leathers, some of which are specially made for the purpose. Good cases may be made from leather prepared in the usual way, especially cow hide. After having selected the quality of the leather to be used the quantity must be ascertained. Whole hides vary slightly in size, and cut on the average from 12 to 13 No. 5. Cases. The standard sizes are:

Number	Circumference.
1	20 ins.
2	22 "
3	24 "

4	26 "
5	28 "
6	30 "

The case for an ordinary football contains about 2 square feet of leather; and in cutting this from small pieces there is more waste than in cutting from a hide. Ordinary cases are mostly made in seven or eight pieces but some have nine or ten quarters. For No. 5 case made in seven quarters a pattern 13 in. long by 3½ in. across the middle as shown in Fig. 2. Take a piece of stout cardbord, and draw on it a straight line 13 in. long; bisect this by a line at right angles, as shown in the diagram. On the line mark off 1½ in. from the centre on each side and draw segments of a circle. Through the four points thus obtained fix the cardboard with a few drawing pins or fine nails to the table before marking to prevent it shifting. After the pattern is cut out correctly lay it on a large sheet of paper and mark round the pattern seven times on it, it will give the measure of the quality of leather. It is

essential that when cut out the pieces will run in the same direction of the hide as shown in Fig. 4, which shows a hide with pattern laid on and shows how it should be cut. Having cut out the case, mark and cut off end if inserted ends are to be put in. These look much neater, and are also stronger, than outside end pieces. Select two quarters and place them face to face, then mark one edge of each $2\frac{1}{4}$ in. from the centre; this will leave $4\frac{1}{2}$ in. for the mouth. See that the marks on each are exactly opposite one another. Small piece to line each of these for lace-holes must be cut; this will strengthen them. Mark them as in Fig. 3. The case is now ready for sewing.

The implements necessary for the above operation are few and inexpensive:—

- (1) A knife for cutting out;
- (2) A few sewing awls;
- (3) A punch for lace holes;
- (4) Ball of fine brown hemp;
- (5) Cobbler's wax;
- (6) Packet of harness needles;
- (7) A pair of clams. Fig (6);
- (8) Inflator syringe. Fig. (5).

Before commencing to sew the quarters together, it will be necessary to make the threads (wax-ends).

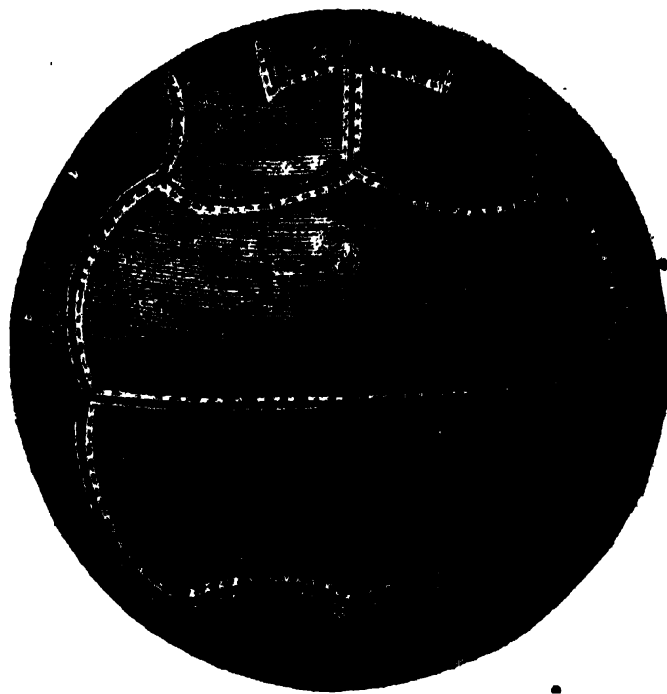
The threads are prepared for sewing by tapering to a point and rubbing the wax up and down quickly a few times. Give a coat of wax to the points take a needle, pass the point of thread back and twist needle round a few times to secure it. Fix a needle to the other point in the same way; select an awl of suitable size, which

should not make a hole larger than necessary and everything is ready.

Commence by stitching on the linings for lace holes, which should be large enough to make the sewing all round the mark. This lining may be held in place either by being pasted or tacked with two or three small nails. Place the quarter within the mouth of the clams, drive the awl through at one of the points of the pattern marked on it, pass the needle up through the hole, and draw the thread through until the middle is reached. This will give a thread of equal length on each side. Make another hole with the awl, pass up the bottom needle as before into the right hand, send the top needle through to the bottom, and with a needle in each hand pull through the threads simultaneously until they lie on each side of the leather and form a stitch top and bottom. Sew round until you reach the place you started from, then cut off



and sew the other quarter to match. When a case with inserted ends is to be made it will be necessary to cut off each end from the seven holes in each of the two lined quarters for the lace-holes, as shown in Fig. 3. The case is now ready for seaming. Take two quarters and place them grain upon grain, taking care that the edges of each are perfectly true. Place these in the mouth of the clams, and commence sewing at one end. Be very careful to drive the awl straight through, and as near the edges as may be without weakening the strong seam; pull both threads in at the same time and with equal tension; this will give, when finished, a ball of good shape if the leather has been properly cut. Sew all the quarters together, leaving only the last seam, where the lace-holes are, unsewn. Be careful to fasten the threads at the ends of each seam by tying them in a firm knot, or when the case is turned and inflated the seams will gape open. The last seam should have about two stitches at each end just sufficient to hold them together while the end pieces are being sewn in. The seams must now be lightly hammered down. Damp the seams well with a wet sponge and push a small iron foot inside the case, taking care that it is always solid where you are tapping with the hammer. Too much force must not be used with the hammer or the grain may be broken. When all the seams



have been treated in this way, prepare to sew in the end pieces. Take two circular pieces of leather, $1\frac{1}{2}$ in. in diameter, to form the ends; place the case, one end upper-most, between the knees. The hole at each end of the case should be not more than $1\frac{1}{4}$ in. across. Make holes with the awl round the edges before sewing; this will guide you better when sewing the end pieces in, and when sewn hammer down to the two seams. The case is now ready for turning.

The case is the right side out, but this last seam must be sewn inside like all the others. Drive one end of the cases down until it rests upon the other. This will give it the appearance of a large bowl or the half of a huge coconut shell. By pulling further apart the half of the open seam which is outside it will be found that the innermost one can be got at. Commence sewing this from the top, and gradually

work down towards the lace-holes, finishing at the mark showing space to be left for insertion of bladder. Fasten the threads well, as a great strain is on this seam. Place foot inside and hammer seam down, then push out the cases again to its natural shape and drive down the other end, but not so equal as before. The inserted end piece must rest about half way along the seam just sewn, and this will bring the unsewn part in the right position for commencing to sew it. About $1\frac{1}{2}$ in. may be sewn, then it will be necessary to shift it a little, and so on until the seam is finished. Lightly hammer the seam as you proceed, or it will not shape properly when blown out. Cut a piece of leather $4\frac{1}{2}$ in. by 3 in. and pare the edges all round to form the tongue piece. This is stitched on to one of the sides of the opening by half a dozen stitches near the middle hole, and is used as a protection to the bladder. A hole should be cut in the middle of tongue piece to allow the pipe attached to the bladder to pass through it. It now only remains to insert the bladder, draw the tube through hole in tongue-piece lay the tongue evenly inside the mouth, and the ball is ready for inflating. Put the nozzle of inflator into the bladder, and when sufficient air has been pumped in, draw the tube off nozzle, hold tightly with thumb and finger, fold tube over, and tie down firmly with wax-end, taking great care that the air does not escape. Push the tube under the side which is not attached to the tongue, draw the mouth together with a good lace, and the ball is finished.

THE OCCURRENCE OF FAULTS IN BLEACHING.

FAULTS in bleaching men give more damages in cost than those in bleaching cotton.

From time to time, the bleacher finds some kind of fault occurring to the fabrics in bleaching. Of course, in some cases, he is not able to see this while bleaching, as the faults generally appear only after the bleaching operation is over, either in dyeing or in finishing.

For example, cotton imperfectly "bottomed" and bleached with bleaching powder is liable to turn yellow on storing. But sometimes, imperfection is hidden by the excess bleaching, but what occurs when it is washed out is, that the blue is stripped off exposing the defect.

GENERAL FAULTS.

It is noticed that some faults seldom appear in goods which are woven with the warp and the filling of the same quality. This is not always possible, hence the difficulty arises in bringing them to the "same degree" of whiteness without deteriorating them.

The bleacher of heavy linens finds that the bleached goods contain damages, which are almost similar to cuts with a sharp instrument. If this defect occurs it will completely damage the goods. The yarns which are affected by this defect are called "Black yarns," on account of the black colour exhibited when they are separated from the other yarns; it is then found that they are tendered.

Under microscope they appear as patches. What is called "Cut" occurs if this tendered yarn is woven, which causes the filling also to be tendered. In the case of the black filling yarn, the warp in the immediate neighbourhood of the black patches become tendered. According to W. Spring, the carbon promotes the decomposition of soap solution. An acid salt soap is produced and the carbon combines with this, to form absorption compounds. It was also shown that these black specks consist of copper oxide.

MILDEWS.

The formation of mildews is a stumbling block on the bleachers' working. The difficulty with this is that its occurrence cannot be seen until a good white is obtained. Moreover it is generally seen on one side only. Various methods have been proposed and tried to remove it with no effect; the only way known to remove it is by strong souring.

MINERAL OILS.

This is one of the commonest faults in bleaching. During the manufacture, the mineral oils from the machinery adhere to the goods leaving more or less a dark colour, due to the presence of finely divided metals and their oxides. It has been suggested that by boiling the goods with soap, aniline oil and adding phenol to the boiling liquors, this defect can be removed. Sponging with a solvent like ether is also recommended but generally this is not used on a large scale in practice.

Nowadays effective methods are accomplished by running goods

through a fairly strong emulsion of olive oil in soda, then soaping hot.

FERMENTATION.

This is also another frequent cause and generally an everyday occurrence, and often gives much trouble to the bleacher. This is caused by the solubility of resinous matters, etc. in tepid water, and generally occurs only while the wetted goods are piled for a long time. In the case of linen the fermentation occurs during the operation of 'grassing.'

TENDERING.

Tendering of cotton in the yarn or in piece is due to the following principal causes:—

- (a) The formation of oxycellulose;
- (b) The formation of hydrocellulose.

The second is the most frequent and is formed by several causes. When mineral acids act upon cotton they give rise to this product. It is also produced when the goods are insufficiently washed after the final souring in the bleaching process. If the goods are singed before bleaching, magnesium chloride (if any) present in size, also gives rise to this, the high temperature of this bringing the hydrolytic dissociation of the magnesium chloride into magnesia and hydrochloric acid, the latter acting on the fibre. Methyl orange is used as an indicator for finding the presence of the free acid by the pink coloration it gives when a drop or two is added to this displaced water in which a little piece

is extracted. This indicator is much more suitable than litmus.

The oxycellulose is formed by the insufficient exclusion of air from the Kier during "Bowking" or to excessive location of the bleaching agent.

Mr. W. F. A. Erman gives an interesting case of tendering, which he noticed when the cotton was dyed with primuline and, bleaching it after dyeing. He found the goods had become tendered, which was due to the dyed cotton having been bleached either in a box or in a box lined with copper. The portions anywhere near the copper were most seriously tendered, especially when the goods were left in the boxes for a considerable time. Then discontinuance of copper boxes alone, made such tendering to vanish, thus this fault came to an end for ever thereafter.

BRASS STARCH MANGLE BOWL.

Mr. S. H. Higgins in a paper read before the Manchester Section of the Society of Chemical Industry in 1911, has given out a very peculiar trouble, perhaps, he came across with the above, the excerpt of which is reproduced below to make the matter very clear:—

A peculiar trouble recently arose with a brass starch mangle bowl. It was found to turn black gradually and to require turning about every six months, while the iron part of the mangle were found to rust very rapidly. In time the "nip" of the bowl became irregular, causing uneven starching and finally a black mark was produced on cloth run through the mangle.

On examining the bowl it was found to contain many small holes, which

seemed to be caused by the vibration of the machinery disintegrating the brass; but on turning the bowl it was found to be very brittle at the surface and much eaten away. The turnings were found to contain mercury. Mercuric chloride in very small quantities had been in the starch as an antiseptic, and had acted with the metal of the bowl; mercury had been liberated from the chloride and had amalgamated with the copper of the brass to form the brittle copper amalgam, (the name amalgam is given to the alloy of mercury and any other metal). Experiments showed that mercuric chloride in very *dilute* solution attacked brass and appreciably hastened the rusting of iron. On removing the mercuric chloride from the solution in the mangle the trouble has caused.

Other antiseptics were tried, e.g., formoline and phenol but these have their disadvantages, if used in any quantity they give the goods an appreciable smell. Salts of copper have often been used as antiseptics but with brass bowls, a similar trouble to that with mercuric chloride might be experienced; the zinc of the brass might displace the copper. If metallic salt solutions are used, the metals of these salts must be more electro-positive than zinc or copper. Zinc salts give no trouble and are of very strong antiseptic value.

MISCELLANEOUS.

There are several other minor faults, of daily occurrence in bleaching; only some of them would be due to the careless working of the bleacher, while others might occur even without his

knowledge, for which he ought not to be blamed.

Iron moulds (i.e. iron rust spots) now and then occur in the bleached goods, and they can be removed by souring and if the fabrics are already white, oxalic acid is used for souring. If this treatment be not found effective, the following applications might be found more effective:—

Applying binoxolate of potash locally;

souring with strong warm hydrochloric acid;

treating with copperas and hydrochloric acid (copperas as a reducing agent).

The appearance of iron stains are similar to those of lead peroxide, which as a rule, form when the goods come in contact with any lead salts previous to chemicking. They can be differentiated by the action of the acidified yellow prussiate of potash (called potassium ferrocyanide) which will give a blue colour with iron (due to formation of prussian blue). When the goods come in contact with wood, black spots occur and they can be removed by souring. There are other faults, such as, green spots, insect and mice holes, tar and grease stains, and damages caused by machinery which are mainly due to the carelessness of the bleacher.

CHEMISTRY TO BLEACHER.

It is very essential for bleachers to have at least some knowledge of Chemistry, to avoid several faults coming across and to be economical in their business. To make the matter more clear at least some knowledge of the

chemicals adopted to cotton bleaching etc., should be thoroughly understood by the bleachers and some ordinary and simple apparatus also must be ready at their disposal for testing etc.

It is well known that the presence of acids is tested by blue litmus, which, in the presence of acids, will turn red.

Tests about which we will have to deal here have, as far as possible, been elaborately mentioned under their respective heads above, yet we give some essential touches for them here as well.

The presence of iron can be detected by moistening a suspended portion of the cloth in the dilute hydrochloric acid and afterwards applying a dilute solution of yellow prussiate of potash, which, if iron be present, will give a blue coloration due to the formation of prussian blue.

It is not so easy to detect the presence of lime, but if a clipping of the cloth is boiled for some minutes in test tube with acidulated distilled water and then filtered, the clear solution is made alkaline with ammonia and afterwards two or three drops of ammonium oxalate added would give out clouds, if the lime is present. This is of course a reliable and easy test for the presence of lime indeed.

By Mr. S. V. IYER,

Just as sure as a straight-forward, honest, pushing salesman is hard to side-tract so a clean, forceful advertising matter is sure to escape the wastebasket.

INDUSTRIAL POSSIBILITIES OF THE TRIPURA STATE.

GENERAL.

TRIPURA State is situated to the east of the British District of Tipperah and has an area of 4116 square miles with 3,04,437 people. The place is said to have been named after an ancient king, *Tripura* of the Lunar race who founded the present reigning dynasty. The State is an ancient kingdom and dates from the Epic Age. From its history we learn it was a mighty kingdom in the old Hindu times. During Mahomedan supremacy also, there is independent evidence to show, that the kingdom was of considerable importance.

TRIPURA STATE.

The adjacent British district is called Tipperah which is nothing but an English corruption of Tripura. This very fact also proves that this kingdom, not long before, included the British district. Even a large portion of the adjacent tracts in the district of Tipperah, Noakhali and Sylhet—about 600 sq. miles in area—which was formerly ruled by the dynasty, is now held by the Maharaja on Zamindari right under the British Government. In the past Tripura shone often as a military power, in the future it may come into prominence for its industries. If its possibilities are fully developed, few districts in Bengal are likely to vie with it.

Out of the total area of 4116, only 589 square miles are under settlement. The remaining tract is hilly and jungly. The uncultivated land can be had on very easy terms. There is an agricul-

tural department in the State. The principal agricultural products are paddy, jute, sugarcane, oil seeds (til and mustard), cotton and tea.

PADDY AND JUTE.

Paddy and jute are exported every year to neighbouring British India in large quantities. No figures about the quantity of paddy exported are available, but it appears from the Administration Report of the State for 13.33 T.E. (1923-24 A. D.) that 54,942 maunds of jute were exported in 1923-24.

Varieties of local paddy are many, some of them are very fine and scented. *Indrasail*, *Dudsar*, *Katakhtara*, *Suryamukhi* and *Charnock* paddies may be introduced in the State and their result watched as these varieties are found best by the Bengal Agricultural Department. Similarly the variety of jute, called *Chinsura green* may be introduced and result watched. This variety is spoken well of for high lands by the Bengal Agricultural Department.

SUGAR CANE.

Large quantities of Gur (molasses) made from sugarcane are exported every year. The scope of the expansion of this industry is immense, regard being paid to the fact that hilly lands have proved very suitable for cultivation of sugarcane. A few years back, a limited company was started to make sugar direct from sugarcane, but nothing came out of it as the organisers could not raise sufficient capital.

Yellow Tanna, a Mauritius variety of sugarcane which has been introduced by Mr. Maggest of Dacca Government Farm and proved very successful, may

be tried here as it is a good disease resister and has a very hard outer cover, for in these hilly tracts diseases and insects are frequent and the jackal often damages the crop.

OIL SEEDS.

78,990 maunds of oil seeds (Til and Mustard) were exported in 1923-24. The State levies an export duty on the raw seeds, but not on the oil. So the price of the seeds are much cheaper than that in British territory. There are many ox or horse-driven *ghanis* (oil mills) worked as cottage industry in the neighbourhood, mainly supplying the local need. Big up-to-date oil mills may be easily started here with profit.

COTTON.

76,590 maunds of cotton were exported in 1923-24. The State appears to have derived Rs. 2,03,606 in that year from export duty on raw cotton and oil seeds. Besides a good amount of cotton is used locally for family consumption and local manufacture. Various kinds of durable and nice-looking cotton fabrics are manufactured by the hill peoples and the Manipuris who have got looms, etc. in every family. These things are greatly sought for by the rich and the poor alike from far and near. The supply appear to be always short of the demand. These home manufacturers may be encouraged by the State with great advantage to its people.

The hilly soil is very suitable for cotton crops and the State has now about 19,000 acres under cotton. The local variety of cotton is short stapled. They are grown in *jhooms* by hillmen

The State Farm has experimented on various long staple varieties and has found "*Dharwar*" kind to be the most satisfactory. The State Agricultural Department is seriously trying to introduce the variety into the State by free distribution of seeds and printed instructions in vernacular about its cultivation.

TEA.

Tea industry has been recently started. It has been found on examination by experts that the soil is of the first quality and is on the same layer with the gardens of Sylhet and that the probable outturn of tea would be 12 to 14 maunds per acre. When the industry has been just begun, the Tea crisis of 1920-21—the worst year of tea trade in its whole history—came. This new industry has not as yet fully recovered from the effect of that depression in the tea market, but it is gratifying to note that some tea concerns are now exporting tea which appears to be of fair quality.

FRUIT GARDENING.

Fruit gardening may also be started on a large scale in this State. Jack fruits, pine-apples, lichis and guava are very suitable for the soil. Thousands of jack fruits are every year exported both by land and river. Pine-apples of different varieties grow easily on the hilly lands and can be had now on every homestead. Lichis, though not indigenous to the part, yet they are found to produce good result. Indigenous varieties of guava abound in the hills. A local gentleman is producing the best Benares guava from his garden and sel-

ling them at high price with profits. Thus fruit growing appears to have a future here. Recently Pratapgar Farm (a limited company) has directed its attention to this.

MILK INDUSTRIES.

Milk industries are also profitable here. Chief domestic animals are cows and buffaloes. Lands for pasturage are plenty. So the fodder question is almost absent. Besides wandering Nepalese people keep buffaloes in herds and their profession is to make and sell ghee which can be had purer and cheaper here than elsewhere. Much improvement may however be made in this connection also. Local cows are very short sized and the output of milk per cow is anything but satisfactory. Cattle may be improved by selection of bulls and crossbreeding.

FORESTS.

Now to forests. The State derived Rs. 5,66,998 from its forests in 1923-24. Many kind of valuable and ordinary timbers, different varieties of bamboos and thatching grass are the chief forest produces and practically the State has a monopoly over the supply of the articles for the neighbouring British territory. So the State easily derives a handsome revenue by levying tolls on the exports.

The State forests are divided into two classes:—viz (i) the open unclassified forests; (2) reserved forests. The major portion of the land is open unclassified forests where there is practically no restriction for felling trees. Besides "*jhooming*," i.e., the hilly method of cultivation is allowed in these tracts to the great detriment of the forests and State revenue. Condition of the forests may be easily raised if proper

control over felling and *jhooming* can be enforced.

There are many cottage industries in connection with the forest produces, such as manufacture of cane and bamboo baskets, mats, and sieves by Tripuras and dug-out (boats), bowls, plates of wood by Reang and Chakmas (hilly tribes).

Agar trees (fragrant wood) from which the essence, "*Aguru*" is made, are also available in the hills in considerable number and the State derives some revenue by leasing out the monopoly of exporting those trees.

Medicinal plants, such as Embelic myrobalan, Chebulic myrobalan, Beleric myrobalan, *kurchi* (*wrightia antidysentrica*), *chulmugra*, fig trees, etc., are plentiful in the hills. So pharmaceutical works both on indigenous and western methods may be started here.

Under the forest income, the State derives a good sum from elephant kheddass. Tripura hills are an abode of elephants from remote times and they are protected by law as none is allowed to kill them. In the *Ayeen Akbari* it is said that Tripura has the best elephants (in India). So catching of wild elephants is an old industry here.

MINERALS.

About the mineral wealth of the State, much cannot be said with definiteness. Kaolin has been found within the State. It is generally believed that Petroleum mines are to be found, for these hills are only a continuation of the same range where Petroleum has been found in Burma and Assam.

COMMUNICATION.

No account of the industries of a tract is complete without some mention about the means of communication thereof, for the starting of an industry often

depends on the transport facilities for its products. The A. B. Ry. passes near the border of the State on the south, the west and the north and therefore there are many railway stations on the borders which are generally connected with the marts in the State by roads. Some of these roads are fit for wheeled traffic and carts are available there. For business purpose the best means of communication is the river traffic. The Tripura State has plenty of hilly rivers passing on all directions and by many railway stations. Many of them can only have boat traffic in the rainy seasons, while the most important ones, such as the Gumti, the Feni, the Howrah, the Khowai and the Manu are navigable throughout the year.

CONCLUSION.

A State which has such valuable raw products and such means of communication has every reason to hope for brilliant industrial future. Progress may be greatly hastened as in Japan if the State helps the pioneers by starting new industries, or in subsidizing and protecting them during their infant stage.

By Mr. Jagadish Ch. Majumdar,
M.A., B.L.

CANNING PRAWNS.

PRAWNS are easy to can but not so easy to preserve in good condition when canned. The method adopted in the Madras Government Cannery is briefly described below. It is based on the method of semi-drying prawns in vogue at Tanur.

The first must of course be fresh and if possible alive when brought to the Cannery. They are at once dipped for a minute or so in boiling water, the precaution being taken of dipping only small quantities of prawns at a time. Some of them will begin to float and all become brilliantly red and fully cooked.

The prawns are subjected to the minimum boiling period and therefore lose as little as possible of their flavour and juices. They are then shelled.

Since prawns are sometimes received or available in large catches it is essential to use some ready and safe method of preserving them till next day. Probably a slight addition of boric acid or sodium hypochlorite would suffice.* Any slight odour from hypochlorite quickly passes away especially on cooking. A natural and better method is however possible.

Proceeding as before the shelled prawns are salted in saturated brine (24° B) for about 20 mins, according to size; being shelled they absorb salt readily. The brined prawns are then placed on trays and semi-dried either in the open air or in a drier. Drying is only partial and is stopped when the prawns are tolerably firm. In this condition they will keep perfectly good for long. When required for use they are soaked in warm water till sufficiently desalted and are then canned as fresh prawns.

Shelling is a tedious operation and there is some loss of edible material, small prawns losing more in shelling than large ones. The shelled prawns are then brined for a few minutes according to size: longer exposure is not necessary. Prawns are packed dry or wet. In the former case they are dried on trays until outwardly dry. The cans for prawns must be enamelled or double lacquered inside: otherwise the constituents of the prawns act on the tin and become spoilt. Dry packed prawns require considerable exhausting since there are large air spaces, however closely they may be packed.

Wet packed prawns are packed straight from the brine tubs and when sealed down weak brine is poured in through a small hole which is then tipped. Cans filled with water, brine or vinegar cannot easily be soldered securely. The difficulty in sealing is however avoided by the use of solderless cans.

Wet packed prawns require shorter processing than when dry packed. Curried prawns may be obtained with merely adding a curry mixture to the ordinary packing.

SMALL TRADES AND RECIPES.

Cleaning Silver.

Plenty of warm, soapy water, to which a little ammonia has been added, should be used to keep silver in good order. After this, cleaning with precipitated whiting is to be recommended.

To Clean Ornamental Brasses.

Turpentine or ammonia removes tarnish from brass, and a brilliant polish follows brisk rubbing with a cloth sprinkled with finely powdered rotten-stone. A paste that will keep ornamental brass work in good condition is made by mixing together oil of turpentine, powdered rotten-stone, and soft soap; apply it with a damp flannel after washing the brass in hot water; wipe off with a dry cloth, and polish. Clean engraved articles with soapy water only and polish with a leather.

Etching Brass Name Plates.

An easy method of etching a brass name plate by means of nitric acid is to first make a pencil drawing on paper of the lettering to be engraved; plain block letters will be the best for the purpose. Then get a brass plate of the size required and about $\frac{1}{8}$ in. thick, polished on one side, and cover with a coating wax (white wax or ordinary beeswax will do) on the polished side. To do this, heat the

plate and rub the wax evenly over the surface; then transfer the lettering to the waxed surface of the plate by means of carbon paper placed between the plate and the sketch, and marked with a pencil. The letters will then appear plainly on the plate. Then carefully scrape away the wax inside the outline of the letters, care being taken not to remove the wax from any part of the plate not to be engraved. A wall of wax is then put round the plate to retain the acid. The acid is then poured on the plate and left there until it has bitten deeply enough; after which the acid is poured off and the plate washed in clean water. The plate should then be polished and the letters filled in with black Japan varnish.

Perfumed Paper.

Perfumed paper may be made by the following simple method. Take two quires of blotting paper, and sprinkle half a wineglass of musk and lavender water, or any other perfume over them, and then stand the blotting paper under a weight until it is dry. Then insert the papers to be scented between the sheets, and place them under a weight for a few hours. On removing them they will be found to be sufficiently perfumed. The blotting paper, if kept from the air, will serve many times, and a few sheets of it placed in a writing-desk that is not

constantly open, will retain some of their perfume for years.

Chlorates as Agricultural Weed Killers.

It is stated that cereal crops may be sprayed in the spring with solutions of alkali chlorates without suffering any ill effects, but that all weeds will be destroyed. Various metallic salts have been used for some time past to a considerable extent for this purpose. It is claimed that chlorates are much better than these, since they are quite non-corrosive for vessels in which they are mixed, are non-caustic, and are not poisonous to animals. Ammonium chlorate is the most suitable salt for the purpose. It should be used in aqueous solution in the proportion of 7 to 8 kilos. per hectare (say, 6½ to 7 lb. to one acre.) Sodium chlorate in much stronger application is a satisfactory non-poisonous weed killer for garden paths.

HINTS AND SUGGESTIONS.

Tennis balls may be cleaned by dissolving a little ammonia in hot water and scrubbing with a hard nail brush. When all grass stains and rust have been removed, dry the balls with a soft cloth and place them in the open air for a time. They should not be put in cold water after scrubbing or the balls will lose much of the bouncing quality so essential to a good tennis ball.

To clean genuine old bronze, place it in cold water to which a few drops of ammonia have been added. The arti-

cles should then be dried and rubbed gently over with sweet oil.

Modern bronze should never be washed. It is merely dusted with a piece of soft silk and rubbed with a small quantity of vaseline.

To keep the creamy appearance of ivory backed brushes or paste made from fine saw dust mixed with lemon juice and a little water will be found excellent for cleaning them. Spread the paste evenly on the surface and allow to dry on. Remove with a soft brush and polish with a soft chamois leather giving a last rub with clean, silk handkerchief.

Powdered magnesia is excellent for removing a slight grass stain on flannel or white serge and should be applied dry. It should be left on for a day and then brushed off. In all cases the sooner a grass stain is attended to the easier it will be to remove it.

A grass stain on flannels should be sponged with cold water, covered with cream of tartar and allowed to dry. The stain will usually disappear when the tartar is brushed off. Grass stains will often disappear from material that cannot be washed if a little alcohol is applied to them.

For a very bad stain on flannel equal parts of the yolk of an egg and glycerine should be mixed together. The mixture should be left on the material for an hour or two and the garment should then be washed.

Mr. M. V. SHAVBHAG.

INDIA'S INDUSTRIAL PROGRESS.

Industrial Uses of Mica.

The importance of mica to the industrial world lies principally in two properties,—it divides naturally into thin even sheets of considerable strength and flexibility and it is not only an excellent electrical insulator but makes such insulation safe by offering great resistance to heat. In wireless outfits a film of mica a thousandth of an inch thick must be able to withstand a charge of as much as 20,000 volts. Mica also plays a small but essential part as an insulator in the manufacture of electrical generating equipment, motors and other apparatus.

The flexibility and uniform thickness of the thin mica sheet make it of use also to transmit sound waves. For this purpose discs of pure muscovite or lithia mica are used as diaphragms in phonographs, telephone transmitters and radio loud speakers.

Mica continues to be useful also for stone and metal workers' goggles, the little windows of fuses and many other purposes where a transparent substance which is not readily breakable is required. While other products have come on the market to take the place of mica and have found limited use no satisfactory substitute for it in the electrical trade has been found or manufactured.

Agricultural Board of India.

It is understood that the Government of India intend to enlarge the scope of the Central Board of Agriculture which is now practically a body of experts by

associating on the board provincial ministers for agriculture and also a non-official element drawn from the wealthy and cultured agriculturists in provinces, so that the work of the Central Board may be widely known amongst the cultivating classes and also that it may be in direct touch with the wants of the agricultural classes in regard to problems of improved agriculture. The Minister for Development has under consideration the feasibility of the creation of a provincial agricultural board, the representative members of which may be put on the Central Board, in order that it may serve as a permanent organisation doing continuous and co-ordinated work in the cause of improved and scientific agriculture in the province.

Silk Industry of Bihar.

The silk industry of Bihar is of ancient date, and of late considerable improvements have been brought about in it mainly as a result of Government action. The silk institute of Bhagalpore, which is a great centre of the silk industry in the province, has now been put on a stable basis and its activities have been enlarged. Attempts are being made to encourage the production of mulberry silk at Khunti in the Ranchi district. In the institute itself much satisfactory work is being done. It should be borne in mind that the weavers of Bhagalpore as a body had no experience except in the weaving of *tasar* and *bafta* (mixed cotton and *tasar*) which they wove on their primitive looms. The institute has intro-

duced the use of mulberry, *eri* and *muga* silk as well as many shades of colour while all work is carried out on fly shuttle mills.

The Hand-Weaving Industry in Bengal.

The hand-weaving industry of Dacca and Murshidabad shows signs of revival lately. Dacca muslin, which was becoming a fable of the Indian weaver's art and was practically unobtainable a few years ago, has taken a new lease of life. Weavers in Dacca are now producing muslin of a quality of which no one would have believed them capable. Murshidabad has not only shown that it can manufacture as fine silks as ever came out of it in days of old, but it can make its silks of a quality to evoke the admiration of the silk manufacturers of Lyons. Of course, the hand-woven silks of Murshidabad, so far lack the finish of the machine made varieties, but they are infinitely more durable. Whatever they may lack now it is not impossible to achieve if the progress made so far is maintained.

But it is not only in the manufacture of silks that Murshidabad is making a bid for a prominent position in industrial enterprises. It has taken up working in ivory in right earnest, and the exquisite carving show conclusively that the Indian artisan has lost none of his art by desultude. Murshidabad has, also, introduced the wollen industry for the home workers, and has produced, and is producing, very serviceable blankets. To show that they are by no means content with the demand for their goods among their countrymen but look further afield

for customers, workers in Murshidabad are making blanket coats for women which are likely to become very popular in Europe on account of their workmanship. Murshidabad is also making silk handkerchiefs on an extensive scale and having them dyed in Serampore to tempt the Europeans of fashion.

Papaw Cultivation in Ceylon.

The cultivation of Pawpaw in Ceylon for the preparation of Papain has extended in recent years, and a high grade product is now being prepared.

The headquarters of the Department of Agriculture is in the Royal Botanic Gardens. The staff consists of a Director, fourteen Scientific officers, three Horticultural Staff officers and a hundred and twenty-eight subordinate officers. A research scheme in conjunction with the Department for rubber is being worked out and discussions are taking place with regard to the establishment of similar schemes for coconut and other industries.

Wireless Development.

The Indian Radio Telegraph Company has lately entered into a contract for the establishment of a beam wireless station in India. It will probably be about six months before the station is in operation, but when established, it will complete the proposed chain of beam wireless communication within the Empire. At present there are radio clubs in Calcutta, Bombay, Madras and Karachi, which are licensed to broadcast entertainments and news; but these stations are too small to do more than serve the towns in which they are situated.

SCIENTIFIC AND INDUSTRIAL TOPICS.

For Mutes to Speak.

To all mutes whose dumbness is due to a defective larynx—said to be large portion of their total number—speech is made possible through the invention of a mechanical device which stimulates the human voice. Its practicability was demonstrated a short time ago before a medical society. Three patients were introduced, and all three, according to persons who were present, although they had been absolutely inarticulate before, were able to talk so that their words were audible and clear in a room of considerable size.

While the application of the device is limited to the stimulation of a low-speaking voice, the invention promises actually to save the lives of persons whose larynxes may be removed by surgery. An operation for cancer of the throat, with the removal of the larynx, for instance leaves the patient unable to breathe through the nose, and it is often necessary to cut a hole in the neck which, while enabling the patient to breathe makes speech impossible.

Raindrop Wonders.

When the sun shines warmly upon sea or land it draws up moisture in the form of tiny globules too small for the eye to see. The warmer the air the greater the number of these globules it

is able to hold in suspension. It is, of course, this moisture that causes rain.

But before a raindrop can form it must have a nucleus, or centre. This is provided by the tiny specks of dust that float in the atmosphere. So tiny are these specks that each is no more than one forty-thousandth of an inch in diameter, and a cubic foot of saturated air may contain a thousand millions of them.

Moisture rising in warm air reaches colder layers, and becomes visible as clouds. A cloud may be likened to a damp sponge that must be squeezed before water comes out of it. The squeezing is done by cold, either a cold hill-top or a current of cold air. So raindrops are formed and at once begin to fall. But in falling they may meet fresh up-draughts of air, and so be pushed or drawn upwards again. If pushed up to a great height the drops may be frozen into lumps of ice and finally fall in the shape of hail.

Water is a liquid of only moderate density, so the size of each drop is limited. No drop can be more than one-fifth of an inch in diameter. If it grows bigger it splits. In splitting it releases negative electricity, and itself gains a positive charge.

But electricity, like water, finds its own level. This process is always going on, every leaf and grass blade act-

ing as silent conductors. It is only when the tension becomes too great—when a cloud is over-whelmingly charged—that lightning flashes and we have what we call a thunderstorm

Plants As Surgeons.

Perhaps the most impressive evidence of something closely akin to intelligent behaviour in plants is offered by a study of injuries inflicted upon their various parts by accidents and insect enemies.

If a leaf or stem is injured, a wound is formed which at once opens up a path by which bacteria and other disease-producing organisms may gain entrance to the tissues. A leaf which has suffered will show a strip of hard, brown tissue developed round the affected area, completely cutting it off from the healthy portion. This isolating layer is formed by the cells in the neighbourhood of the wound, and, since it is impermeable to water and sap, the parts lying outside it die.

Thus the plant may be said to amputate portions of its body which become injured, to prevent the infection spreading to other parts, the useless member being sacrificed for the ultimate good of the whole. •

Plastic Wood.

Wood in a plastic condition is now a manufactured product that seems likely to prove valuable where wood in its ordinary condition is used. The material is of the consistency of thick paste or moist dough, and in its plastic condition will adhere firmly to wood,

metal, or other material—the foundation must be clean, dry and free from grease.

It can be moulded by hand into any conceivable form, and hardens on exposure to the air to a tough, solid waterproof substance similar in nature to wood but without any grain. When dry it is entirely free from any tendency to warp, crack, blister, peel or crumble, even when exposed to moderate heat. A slight amount of contraction takes place on drying, but the material adheres so firmly to its base that it does not draw away from anything to which it is properly applied. When dry, it can be worked with ordinary joiner's tools, or turned in a lathe.

Articles can be built up entirely of plastic wood, in thin layers, each layer being allowed to harden before the application of the succeeding layers, but where any bulk is required some sort of core or foundation should generally be available.

Plastic wood finds one of the most useful fields in the engineer's pattern shop. It can be moulded by hand into any desired shape, and when set can be worked up by the usual pattern-maker's tools. Fillets, straight or curved in the most intricate manner can be modelled quite easily by the fingers or with a hollow tool. There are many occasions in pattern shops undertaking caused or jobbing work, where existing castings are required to serve as patterns. Bearing brushes, valves, seats and the like, are typical examples. These castings can be built up with the plastic wood to provide for the streng-

thening of existing parts, and to allow for contraction and machining. It can generally be worked with fingers to give a sufficiently smooth surface for moulding. In other cases the final surface can be formed in the lathe, or finished with file and sandpaper. When set it is waterproof and so has no tendency to drag the sand in the mould.

Shakes in timber, dead knots, shrinkage, openings at joints and breakages can be filled in or made good without the repair being evident. Holes left after countersinking screws and nails can be filled up so that no trace of them remains. Mouldings and carvings that have been damaged can be repaired and even replaced entirely by plastic wood. Not being affected by damp or by changes of temperature or climate, it does not shrink when dry, or crack or peel away as happens with putty or other filling material and the surfaces of the original material and the filled portion are absolutely uniform. The dried plastic wood will hold nails or screws without splitting.

A Gas-filled Tennis Ball.

A novel tennis ball, filled with nitrogen and said to be air-tight, has been invented by a technical expert at Fort Dunlop. The aim has been to avoid as far as possible the present loss of air owing to leakage through the joints, the plug, and the rubber wall itself. The difficulties have been got over by using two thin gutta percha balls, cemented together to form what appears to be a large size ping pong ball. Certain chemicals and a few spots of water

are placed within the two shells before they are sealed together. This hollow sphere, covered with soft rubber, is then placed in a mould and the whole is heated to a temperature of about 300 deg. Fahr. That not only vulcanises the rubber, but sets up chemical action between the gas-forming ingredients and inflates the ball. After that the moulds are plunged into ice-cold water. Afterwards the rubber ball is covered with felt in the ordinary way. The result is that for the first time since tennis balls were made, standards of compression and 'bounce' can now be established with scientific exactitude.

Scent and Memory.

The sense of smell in Man is superior to his sense of taste. Flavour, indeed, is purely an olfactory sensation. Destroy the sensitiveness of the membranes of the nose, and you lose your power to enjoy and distinguish flavour; and losing your power to enjoy flavours, you vitally impair the flow of digestive fluids and vitiate your powers of digestion.

Though we humans, relying on sense and hearing, neglect our sense of smell, it can be very highly educated, as perfumery experts know. There is practically no limit to the capacity of the olfactory organs. On the other hand only four simple sensations can be appreciated by the taste organs in the tongue.

So little do we bother about this priceless piece of our equipment that no descriptive terminology of odours exists. The study of the olfactory senses has been almost totally neglected. And yet, its physical manifestations apart, smell

plays an important part in our spiritual and mental life. It can stimulate the imagination like music; it can evoke memories which otherwise would lie for ever buried under the obliterating load of years.

Trees and flowers emit odours which fascinate the insect world. Bees, wasps and ants recognise members of their respective communities by their smell.

Some psychologists believe that perfumes exert a powerful psychic effect that may be the key to many problems of crowd psychology. The medical books tell us strange stories about the aspect of odours.

Indian's Gift for an Observatory.

An Indian millionaire, engineer and scientist, Mr. Assam Dina, and his American wife, formerly Miss Mary Wallace-Shillito, of Cinicinnati, are causing to be constructed on Mount Saleve (Geneva) an observatory which is to be the largest in the world. It will be given to the French nation. The building, the instruments, and installations will cost £1,250,000.

The Saleve is an isolated peak 4,430 feet high, with an extremely clear and pure atmosphere, permitting observations of the sky during the greater part of the year.

An aeroplane will assure the daily service information. A powerful wireless station will be erected, which will be in constant touch with similar stations throughout the world, to report atmospheric conditions and changes.

The most important installation, however will be the enormous teles-

cope, which has a diameter of 105 inches—five inches more than that at Mount Wilson, U. S. A.—and several smaller telescopes of from twenty to sixty inches in diameter.

The Eye as Camera.

Few people realize the extreme minuteness of the image received by the eye.

The eye is a camera which has a double convex lens in front, a sensitive plate (the retina) behind, and is blackened inside, and, as in the plate of the photographer's camera, the image in the retina is upside down.

The entire surface of the retina is only about one square inch, a very small portion of it receiving the image of the outer world. This portion where the image is received is a specialized, slightly hollowed spot about one-twelfth of an inch in diameter—the macula lutea.

The photographic camera is adjusted for light by stops; the eye camera, by little muscles that dilate or contract the pupil.

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FORMULAS, PROCESSES & ANSWERS.

Paints and Varnishes.

547. Mahadev Rao—Asks how could we define paint and varnish.

Varnish is a solution of resinous matter which is spread over the surface of any body, in order to give it a shining, transparent and hard coat, capable of resisting, in a greater or less degree, the influences of air moisture. Such a coat consists of the resinous parts of the solution, which remain in a thin layer upon the surface after the liquid solvent has either evaporated away or has dried up.

Oil paint is a mixture of pigment such as ochre, iron oxide, white lead or zinc oxide, with a drying oil such as linseed oil, the mixture being thinned with turpentine in order to produce a semi-liquid which may be applied to a surface with the object of preserving or beautifying it or both.

Paint is defined as a preparation of pigments or colouring substances, made by mixing with some suitable vehicle as oil, water or varnish, and forming when applied to a surface an adhesive coating.

Cassava Flour.

481. B. S. Naik—Writes, 'Could you throw some hints on the preparation of cassava flour.'

Cassava or tapioca, as it is popularly known, is a product of the plant *Manihot*

utilissima, indigenous to Brazil, but lately cultivated in nearly all tropical and sub-tropical countries. It is derived from several euphorbiaceous plants of the genus *Manihot*, the fleshy root of which yields the nutritious starch, also known as Manioc. In South America, Africa and the West Indies it is a staple food, *M. Manihot*, (bitter cassava) being the variety most commonly used. The juice contains hydrocyanic acid, which is removed by cooking. From this cassarup is prepared. *Manihot palmata-dipi* (sweet cassava) is a variety chiefly used as a table vegetable and fodder crop. The starch provides the tapioca of commerce and also cassava bread.

Preparation of the flour is very simple, the mere opening of the cell walls liberating it. This is done either mechanically by grating or biologically as the result of bacterial action, the former method being followed in Java. Preparation in the native villages or in the factories is almost identical except that in the latter power-driven machinery takes the place of hand operation.

Practically the same classes of machinery are used for tapioca flour as for potato starch making, slight modifications being necessary for the sieves of the grating and pulping machines, cassava roots being more fibrous than potatoes and the starch grains smaller.

Stencil Ink.

665. K. Bhagi Row—Wants a recipe for stencil ink.

An excellent stencil ink for boxes and packing cases can be made by mixing lampblack, fine clay and gum arabic together. The lampblack gives the colour, the clay furnishes a body and the gum an adhesive. Water will answer as a solvent, but lampblack is so light that a few drops of vinegar or other acid will facilitate its admixture with the other ingredients. Any good adhesive substance such as dextrine or gum tragacanth, may be found to answer as well as gum arabic to bind the mixture.

ANOTHER RECIPE.

Nigrosine	1 oz.
Tannin	2 drs.
Glycerine	4 oz.
Vanadinate of ammonium	10 grs.

Others may be made from other aniline colours.

Essence of Vinegar.

817. B. L. Sehgal and Co.—Want to prepare essence of vinegar.

Take some vinegar in shallow vessels and surround with ice; the watery parts will freeze but the spirit will remain fluid. Repeatedly surround the fluid as it is obtained. If the process be carried on properly a pint of strong vinegar will be reduced by it to about a table spoonful of a fine flavoured essence, and very pungent.

Copal Varnish.

The same gentlemen want a recipe for copal varnish.

Melt 8 pounds best copal and mix with 20 pounds very clear matured oil. Then boil 4 to 5 hours at moderate heat, until it draws threads; now mix with 35 pounds oil of turpentine, strain and keep for use. This varnish dries rather slowly, therefore mix it one half with another varnish, which is prepared by boiling for 4 hours 20 pounds clear linseed oil and 8 pounds very pure white anise rosin, to which is subsequently added 35 pounds oil of turpentine.

Case Hardening.

484. M. R. Pillai—Desires to know all about case hardening.

Case hardening is the name of the process by which iron tools, keys, etc. have their surfaces converted into steel. Steel when very hard is brittle, and iron alone is for many purposes, as for fine keys, far too soft. It is therefore an important desideratum to combine the hardness of a steely surface with the toughness of an iron body. These requisites are united by the process of case hardening, which does not differ from the making of steel except in the shorter duration of the process. The property of hardening is not possessed by pure malleable iron; but by a partial process of cementation the iron is converted externally into steel, and is subsequently hardened to that particular depth. Tools, utensils or ornaments, intended to be polished are first manufactured in iron and nearly finished after which they are put into an iron box together with vegetable or animal charcoal in powder, and cemented for certain time. This treat-

ment converts the external part into a coating of steel which is usually very thin, because the time allowed for the cementation is much shorter than when the whole mass is to be converted into steel. Immersion of the heated pieces in water hardens the surface which is afterwards polished by the usual methods.

Inks for Brass Seals.

1013. B. G. C., Arni.—Wants recipes for brass seals.

(1) Black.

Aniline Black	5 parts.
Oleic acid	6 „
Castor oil	94

(2) Red.

Bordeaux red	15 parts.
Aniline Scarlet	15 „
Crude Oleic acid	50 „
Castor oil	950 „

In preparing these inks rub the aniline (oil soluble) to perfect smoothness in oleic acid; then add the oil, little by little, with constant rubbing. After incorporation of the whole of the oil, heat the mixture, under constant stirring, to about 167 deg. F.

Tincture Benzoin.

900. C. P. R., Rajahmundry—Writes how to prepare tincture benzoin.

(1) Tincture Benzoin is prepared by dissolving 2 oz. Benzoin in 20 fl. oz. 90 per cent. alcohol.

(2) Tincture Benzoin Composita is prepared as follows.

Benzoin	2 oz.
Alpes	175 gr.
Storax	1½ oz.
90 per cent. Balsam of Tolu	½ oz.
90 per cent. Alcohol	to 20 oz. (fl.)

Dyeing Mother-of-Pearl.

985. Roll 17362, Cherrapunji—Asks for a process of dyeing mother-of-pearl articles.

Basic dyes are mostly employed in dyeing mother-of-pearl. The dyeing is done either in an alcoholic solution or in a water solution to which an equal volume of alcohol is added, as the alcoholic liquor penetrates the mother-of-pearl material and stains it better than water alone. Before dyeing the material is prepared by steeping in a solution of potassium carbonate at 120 deg. F. Then wash well and dry. The goods are then dyed by steeping in the colour solution for several hours until the desired shade is obtained. After dyeing rinse well in cold water and dry slowly to prevent cracking. Black and dark browns are frequently produced by staining them with a solution of silver nitrate and allowing to oxidize.

Mercerising Cotton Yarn.

1111. B. P. Patna.—Kindly throw some hints on mercerising cotton yarn.

Good results are obtained by mercerising twists, in which the individual fibres are more firmly embedded, than with single yarn. On the other hand hard-twisted yarns present a certain difficulty, inasmuch as the liquor does not penetrate right through so easily. This may be overcome by boiling them—preferably with an addition of turkey-red oil or textile soap and then mercerising them without any intermediate drying.

The material to be treated must be well gassed before-hand, in order to obtain a smooth surface; and of course it must not be put through any operation which would tend to roughen it.

Bleaching is not advisable preliminary to mercerisation, as it reduces the lustre, hardens the feel of the material, and the loss in weight on mercerisation is then sometimes very considerable. The best plan is to boil the material first, then mercerise, and finally bleach.

After mercerising the cotton is squeezed, washed and soured.

Amalgam for Mirror.

870. K. A. R., Rajahmundry.—Wants to learn the process of making mirrors with mercury amalgam.

The glass plate having been thoroughly cleansed from all grease and dirt with putty powder and wood ash, the workman proceeds to lay a sheet of tin foil of larger dimensions than the plate to be silvered smoothly upon the silvering table, pressing out with a cloth-dabber all wrinkles and places likely to form air bubbles. A small quantity of mercury is then poured upon it and uniformly distributed by means of a fine woollen cloth. When the surface is uniformly covered more mercury is added so as to attain a height of 2 or 3 lines; the coating of oxide is removed with a wooden rod and a brilliant surface produced. The plate of glass is then pushed slowly forward from the side with the longest edge foremost, and dipping below the surface of the mercury so completely to exclude the air. In this way the glass is brought into contact with the metals and a brilliant surface produced. The plate may now be said to be floating on a bed of mercury. To get rid of the excess of metal the mirror is load-

ed with weights and the table inclined 10 or 12 deg. when the excess of mercury drains off. A further portion is got rid of by setting the plate up on an edge, and in the course of three or four weeks a dry, permanent coating of the amalgam is left upon the plate.

Preparing Liquid Ammonia.

928. M. T. M. Z., Kumnamkulam.—Asks, How is ammonia liquefied?

Up to the moment of liquefaction, the apparatus for manufacturing anhydrous liquid ammonia from raw gas-liquor is exactly the same as that employed for the production of chemically pure liquor ammonia. For this reason, the liquefaction of ammonia is as a rule only carried on in connection with that of liquor ammonia.

The manufacture of liquid ammonia is carried out by the simultaneous application of cooling being principally applied for taking up and carrying away the heat, set free by the compression of the gas.

The apparatus consists of an ammonia compressor with steel valves, placed on a box which in its upper portion holds the condensing worm and in its lower portion a welded wrought-iron cylinder in which the liquid ammonia from the worm is collected. The cooling water enters at the bottom and issues at the top. The gaseous ammonia aspirated by the compressor is liquefied in the worm by means of combined cooling and pressure, and runs into the cylinder, from which it is forced by a pipe, reaching to its bottom, into steel bottles holding about 20 kg.

Ink Tablet.

887. P. C. P., Cawnpur—Enquires how ink tablets are made.

Good quality of ink tablet may be obtained by the following recipe.

Nut-galls	2 ozs.
Ferrous sulphate	5 grs.
Copper sulphate	15 grs.
Alum	1 dr.
Sugarcandy	90 grs.
Gum arabic	2½ drs.
Cream of tartar	15 grs.

Make into a stiff paste with water. Mould and dry.

Nickelling Small Articles.

900. C. P. R., Rajahmundry—Writes, kindly give some directions for nickelling iron and brass things.

Small steel articles, after cleaning, immersion in the acid dip, and rinsing should be suspended in the bath, if practicable, between other articles of larger dimensions, so that deposition may take place slowly and gradually, otherwise the articles are very liable to strip. It is also very important that they should be placed in the bath *immediately* after being cleaned, since even a few invisible film of oxide to form on the surface, will prevent the nickel from firmly adhering to the steel. After nickelling, the articles are rinsed in hot water and finished with high polish. Small steel or iron articles which are not required to receive a stout coating of nickel are first steeped for a short time in the potash bath, and after being rinsed are dipped for a moment in the hydrochloric acid dip, again rinsed, and put into the nickelling bath,

without any preparatory scouring, and given a short immersion only.

When small brass and copper articles have to receive a good coating and afterwards to be finished bright, they must be scoured after polishing and treated in all respects the same as larger work. Articles which are not required to be stoutly nickelled, however, but only moderately well coated with this metal, may be polished with the rouge composition, instead of with lime in the usual way, and then placed in the bath without previous scouring. When they have received a moderate coating of nickel they are rinsed in hot water, and afterwards finished with the mop, with the aid of the same composition.

Lice Killer.

1043. S. M. C., Letekujan.—Wants recipe for a lice-killing medicine.

One of the best remedies for head lice is a vinegar of sabadilla prepared by the following process.

Sabadilla seed	5 parts;
Alcohol	5 „
Acetic acid	9 „
Water	36 „

Macerate for 3 days, express and filter. Directions for use:—Moisten the scalp and hair thoroughly at bed time, binding a cloth around the head, and let remain overnight.

Blending Teas.

849. G. R., Karevar.—Writes, kindly throw some hints on blending of teas.

A very important factor to be taken into account in preparing an attractive tea blend is the size and appear-

ance of the leaf. Great care must be exercised in mixing so that dust or very small tea is not too much in evidence. The general appearance of the blend must also be considered. Lastly, the selection of a tea depends to a great extent upon the ultimate purpose for which it will be required.

A blend suitable for general purposes is, as a rule, composed of Ceylon and Indian, the proportion of each kind varying according to the state of the market and time of the year. At certain periods Indians are scarce, and consequently difficult to use freely, but fortunately, Ceylons sometimes come to the rescue and a larger proportion can be used with advantage. During the summer months it has been found that consumers prefer a lighter beverage than when the weather is cold. In such cases the Ceylon flavour may safely predominate. Certain Ceylon and Indian teas will be found to "take the milk" satisfactorily, without mixing them with other growths. Such are known as "self-drinking teas" and if carefully selected will prove most useful, as they can be retailed direct from the chest without further manipulation. It is sometimes possible to prepare a blend, having all the characteristics of a perfect mixture from one or two teas; on the other hand, it may be necessary to use several lots before a full, rich, and bright liquor is obtained; whichever course is adopted, it will be useful to keep standards of all component parts, so that when the blend has to be matched each tea may be followed as closely as possible.

Landry Soap.

862. R. M. Baijnath—Wants a recipe of good laundry soap.

Coconut oil	23 lbs.
Tallow	442 „
Caustic soda, 35 deg. Be.	302 „
Sodium silicate	233 „
	1000 lbs

Mix the melted tallow and oil at 112—118 deg. F. Mix the caustic lye and sodium silicate at room temperature. Run the lye and silicate into the fats whilst the latter are in rapid agitation. Crutch until firm enough to retain mark. By substituting white grease for tallow a cheaper soap may be made.

Camphor and Carbolic Soaps.

873. M. C. D., Calcutta—Wants recipes for camphor and carbolic soaps.

Here are recipes for camphor soaps.

(1) Soft camphor soap is made by dissolving 10 per cent. of camphor in melted "soft soap." It is used as a salve for sores, etc.

(2) Milled camphor soap—Add to 25 lbs. of white stock soap 2 lbs. of camphor finely powdered (or preferably dissolved in spirit) and incorporate thoroughly in the melting machine. Cut the soap into tablets and wrap tightly in paper and tinfoil as camphor is volatile.

Camphor soaps are used for chilblains and in the bath for rheumatic pains.

(3) Carbolic soap.—Melt rosin curd soap and crutch in about 2 per cent. of carbolic acid in crystals. Place in a frame, and when cold cut into squares and mould in the same way as ordinary fancy soaps.

Manufacture of Glauber Salt.

915. M. M. B., Bombay.—Requests us to describe the process of manufacture of Glauber Salt.

Small quantities of sodium sulphate are found in most natural waters. Preparation of Glauber's salt from this source on an industrial scale is only exceptionally possible, chiefly when the liquid has been previously concentrated for other purposes, and Glauber's salt can be got from the mother-liquors. This is especially the case in the manufacture of common salt from sea-water or from brine; Glauber's salt can be made both from the mother-liquors and the pan-scale obtained in the manufacture.

Sodium sulphate usually in a very impure state is manufactured as a by-product in sundry chemical manufactures:

(a) In the manufacture of hydrochloric acid from common salt and sulphuric acid, in cast iron cylinders and in glass retorts. Here hydrochloric acid is the principal product and the by-product is called cylinder cake or salt cake.

(b) Salt cake may be obtained as a residue in the manufacture of nitric acid from Chili saltpetre.

By far the greatest quantity of sodium sulphate is used in an impure state as the anhydrous salt. When pure sodium sulphate or Glauber's salt is to be made from the impure salt cake, this purification is always performed by dissolving, precipitating the impurities, separating the liquor from the precipitate, and obtaining the desired product from the solution.

The preparation of pure crystalline Glauber's salt is considerably easier than the preparation of the anhydrous salt. The crude salt cake is dissolved in water heated by open steam in lead-lined wooden vats. The flocculent brown precipitate produced by the addition of lime and bleaching powder is allowed to settle and the clear liquor drawn off by means of lead siphons. The sludge is washed and the washings

used to dissolve the next batch of salt cake. The clear liquor is then allowed to crystallise by cooling in flat lead-lined tanks.

Preparing Lead Shot.

1005. B. W., Kurnool.—Asks how lead shots are prepared?

Lead shot is generally prepared by allowing the melted metal to fall in drops from a tower of considerable height. For this purpose shot towers and shot wells have to be constructed. At the top of the tower melted lead is poured into a colander and the drops are received into a vessel of water below. The surface of the lead becomes covered with a spongy crust of oxide called "cream", which is used to coat over the bottom of the colander to prevent the lead from running too rapidly through the holes, whereby they would form oblong spheroids instead of spheres. The colanders are hollow hemispheres of sheer-iron, the holes in them differing according to the size of the shot. They must be at a distance of at least three times the diameter of the shot from each other, as otherwise it might happen that two or more drops of lead would while falling down, unite to one mass, which of course, would be useless and have to be remelted.

The water serving for the reception of the drops must be frequently changed to prevent it from becoming too hot or boiling. By some it is recommended to pour a layer of oil upon the surface of the water, the shot retaining thereby its spherical shape better than when dropping directly into the water. To prevent the shot, when taken from the water, from losing its metallic appearance by oxidation, a small quantity of sodium sulphide is dissolved in the water serving for the reception of the shot, by means of which the drops falling into it are at once coated with a thin film of sulphide of lead of a lustrous, metallic, gray-black colour, which is permanent even in moist air.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

838. Fath Mohamed.—Vernacular equivalents of gypsum are kulnar, kurpura silasit etc. Gypsum may be bought of Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta.

839. S. G. Patinge.—For dyeing cotton fabrics you may go through December 1924 issue of "Industry" and some books on dyeing such as The Principles and Practice of Dyeing by Ramesh Chandra Roy Chowdhury and Dyeing of Cotton Fabrics by F. Beech to be had of Chackraverty Chatterjee and Co. Ltd., 15 College Square, Calcutta. You may go through Indian Textile Journal, 27 Meadows Street, Fort Bombay and Textile Mercury, Carr Street, Blackfriar, Manchester.

841. E., Kinsman.—Mica chinneys may be bought of Seth Mica Works, Mica Chimney Works, Agra.

842. G. B. Bhusari.—Seek medical advice. Husk may be used as cattle fodder. Condemned globes cannot be repaired.

843. F. Ahmad.—Recipes of various kinds of "hulwas" appeared in last issue.

847. B. K. Balvant Singh.—Refer your query to Registrar, Joint Stock Companies, Government Place West, Calcutta.

848 T. M. Chazarian.—For analysis write to R. V. Briggs, 8-B. Lall Bazar Street, Calcutta.

849. G. Rao.—Process of blending tea will appear in an early issue.

850. V., Sankaranarayana Murty.—For jewellery you may try B. Sirkar and Sons., 131 Bowbazar Street and Benud Behary Dutt, 1-A Bentinck Street; both of Calcutta. Wants to buy Krenientz plate buttons.

851 Sundar Singh—Articles on canning appeared in April, May and June 1924 issues of "Industry." You may write to the Secre-

tary, National Homeopathic Medical College, 336 Upper Chitpur Road, Calcutta.

853. B. H. Khare—you may use fly cantharides in your hair oil to prevent falling of hair. Cantharidine is used on rare occasion. You should not use tallow in place of vaseline as it has got a medicinal property.

854. Narayan Kristna.—Needles for knitting machines may be supplied by E. B. Bros. & Co., 11, Dharamtala Street, Calcutta.

855. K. Srinivasalu Naidu.—An article on phenyle manufacture appeared in Oct. 1921 issue. Recipes of pomade will be found in September 1924 issue. Process of preparing artificial asafoetida appeared in July 1923 issue. Your other queries are receiving our attention.

856. C. Raju Mood.—Tamil equivalents of Hellotropum Indicum are Kizhkaynelli and Kizhanelli. Ficus Bengalensis is banyan tree. It is not possible to extract gold from lead.

858. C. S. Basuvai Chetty.—Essences may be bought of Sickri & Co., 58/4, Canning Street, Calcutta.

859. V. K. Kandaswamy Chetty.—For learning mechanism of hosiery industry write to Economic Hosiery Mills Ltd., 55/2, Dharamtollah Street, Calcutta.

860. Satyanarayan Murthy.—A simple cement for glass may be prepared by making a paste of casein and waterglass.

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864. Mathura Prasad.—For quick and increased sale of your goods advertise in pages of newspapers and periodicals.

865. Illegible.—For brass sheet and tin sheet write to, Balmer Lawrie & Co., 103, Clive Street, Calcutta; for metal sheet cutting machines enquire of Oriental Machinery Supply Agency, 20/1, Lall Bazar Street, Calcutta. Small flour milling machines may be supplied by Messrs. W. Leslie & Co.; 19, Chowrginhee Road, Calcutta. "Industry" is the only journal of its kind in India.

866. Thakur Singh Paul.—Boot lace making machines may be bought of Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta. Mahua oil may be had of Chagna Marwari, Mohal, Manbhum; Parbhudas Kashiprashad, Dhamtari and The Chawla Rice, Flour and Oil Factory, Gujranwala. No such journal is known to us. Wishes to buy Mahua seed and secondhand industrial books.

867. Dharm Singh.—Rough sandstone cannot be made smooth and glazing

871. Ranganathan.—Your first query is not in our line. Try to secure the patent medicines locally.

872. Shaikh Peer Mohammad Yarmahomed.—Horse shoe nails may be supplied by Holmberg Fassbender & Co., Aktiebolag, Stockholm, and The United Horse Shoe and Nail Co., Goteborg; both of Sweden. Horse shoes may be supplied by Hafsa Brunks Aktiebolag, Havla and Uddeholms Aktiebolag, Uddeholm; both of Sweden.

874. P. Lakshminarayana Karnan.—The following is the list of important paper mills of India. (1) Titagurh Paper Mills Limited, Chartered Bank Buildings, Clive Street, Calcutta; (2) Bengal Paper Mills Limited, 103, Clive Street, Calcutta; (3) Upper India Couper Mills Co., Limited, Badshahganj, Lucknow, (4) India Paper Pulp & Co., Limited, Andrew Yule & Co., Limited, 8, Clive Street, Calcutta, and (5) Deccan Paper Mills Co., Ltd., 561, Bhawani Peit, Poona.

876. K. S. V. Nath.—Matches may be supplied by Svenska Tandsticks, Aktiebolag, Stockholm, Sweden. For label write to C. L. Keller,

Brandenburgstrasse, 43, Berlin and R. Rodger Maxstrasse 9, Dresden; both of Germany. Your other enquiries being in the nature of an advertisement should not be published in these columns.

879. Md. Gauhar Khan.—For spare time works go through the New Idea columns of "Industry." For price of thread balling machine write to Oriental Machinery Supply Agency Limited., 20/1, Lall Bazar Street, Calcutta.

880. K. A. Kannan.—Wants to buy ceramic enamels.

881. Pankala Row & Co.,—Dietz lanterns are imported by Messrs. Elliot and Co., 6A, Clive Row, Calcutta. Diamond thread may be bought of Nilmoney Haldar & Sons, 106, Radha Bazar Street, Calcutta. For cigarettes of required brand write to Karim Bux and Elahie Bux Bros., 58/4, Canning Street, Calcutta.

883. Anibe Bux Singh.—Manufacturing rubber soles is a costly affair. It is done in a special kind of moulding machine which produces rubber soles from India Rubber.

885. N. G. Lahori.—For motor and motor cycles write to S. J. Matthews, 33, Park Street, Calcutta. You may consult Indian Story Teller, 154, Cornwallis Street, Calcutta. For gramophones try S. N. Bhattacharyee, 5, Dharamtollah Street, Calcutta and K. C. Dey and Sons, 96, Lower Chitpore Road, Calcutta.

888. Abdulla Mahomed Ayooob.—For industrial books write to Chakarverthy Chatterjee & Co., Ltd., 15, College Square, Calcutta.

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155, Juma Masjid Circle, P. O. Box 2082,
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889. Saiyid Azim.—Porcelain ink jars may be bought of Satya Charan Paul 194, Old China Bazar Street, Calcutta. Cardboard is manufactured by Bengal Paper Board and Paper Mills Limited., 8, Old Court House Corner, Calcutta.

890. S. B.—For registration correspond with P. Lodge and Company., P. O. Box 6772, Calcutta. Such recipe is not known to us.

891. P. N. Mathur.—Refer your query to the Philaletic Society of India, The Mal, Lahore.

892. K. R. S. Tomara.—The machines you require may be bought of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

893. S. S. Gupta.—Reply to your queries appeared in May issue under No. 500

894. S. C. Ghosh.—Java sugar may be bought of Hajee Ahmed Ganny, 23, Amratolla Lane and Hajee Jamal Noor Mohamed, 2, Amratolla Lane; both of Calcutta. Blocks for clico printing may be supplied by Padmashah Chackraberty, Noakhali. Yarn may be had of E. B. Bros., & Co., 11, Dharamtollah Street, Calcutta. Tea may be supplied by Mukherjee Brothers, 17/19, Sham Bazar Bridge Road, Calcutta. Dyes used in tanning may be bought of Banshidhar Dutt, 126, Khangraputty, Bara Bazar, Calcutta. Try to secure leather locally as hide and skin industry is carried on largely in the United Provinces.

895. Karm Chand.—There is no school known to us where block making is taught. Try to be an apprentice in a block making concern.

896. Vishnu Sanibaji Machila.—For loan you may write to Gillanders, Arbuthnot & Co., Gillander Buildings, Clive Street, Calcutta.

897. P. M. Rathnasabapathy Nadur.—Please write clearly what machinery you want, otherwise it is very difficult on our part to give names and addresses. However you may write to Messrs. Thacker Spink & Co., 3, Es-Ltd., 20/1, Lall Bazar Street, Calcutta.

898. E. V. Unnicherria.—Can supply talipot palm seeds. For securing agencies please go through sale and exchange pages of "Industry."

899. Kishori Mohan Roy.—Cigarette lighters may be bought of G. Goodman & Co., Bangalore Cantonment. For disposing lemon juice advertise in pages of newspapers and periodicals. Process of preserving milk appeared in June, 1922, issue.

901. Behari Advertising Agency.—Glass bottles may be supplied by Max Heune, Leipzig, 155, Germany. For books on indoor games write to Messrs. Thacker Spink & Co., 3, Esplanade East, Calcutta. Your other queries being in the nature of an advertisement should not be published in these columns.

903. Ambalal V. Patel, P. O. Box 304, Janga T T. E. Africa.—Process of waterproofing cloth appeared in July, 1922, issue. Recipe of fire-proofing cotton fabric will be found in January, 1923, issue. For analysis write to R. V. Briggs, 8B, Lall Bazar Street, Calcutta.

904A. Pallachi Ramcharyl.—Your query is unintelligible.

905. Lace Trading Co.—For industrial books enquire of Chuckerbutty Chatterjee & Co., Ltd., 15, College Square, Calcutta.

906. E. K. Shankarlal & Co.—To communicate with any querist write him with name and number under care of "Industry" when your letter will be duly redirected.

907. Vyas Manilal Chunilal.—We do not deal in any article, we only furnish necessary information to our constituents.

908. Jeitoo Lall & Sons.—For seed write to W. Atlee Burpee & Co., Philadelphia, Pennsylvania, U. S. A. For iron hoofs enquire of K. C. Ghattak, and Sons, 2 Darmahatta Street, and Preo Nath Ghose, 21 Darmahatta Street; both of Calcutta.

910 B. Bose.—For repairing waterproofs write to Bengal Waterproof Works, 2 Nazarali Lane, Calcutta.

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29-1, Telepara, Sampooker St., Calcutta.

912. H. V. Subba Rao.—For cinema films enquire of J. F. Madan & Co., 5, Dharamtollah Street, Calcutta.

913. Beni Kunth Nath.—Process of polishing pearls appeared in August, 1923, issue.

915. M. M. Bathena.—For sizing go through December, 1924, issue of "Industry." Process of preparing potato starch appeared in September 1924 issue. Formula of washing soda will be found in July 1924, issue.

918. Hajee Ahmed & Sons.—Makaradh-waja may be bought from Dacca Sakti Oush-dhalaya, 62½, Beadon Street, Calcutta.

919. M. J. Deen.—Wants address of Mr. Gustavji Jamserji, of Gwalior State and of Mr. F. Staunch, agent of Bengal Brass Co., at Madras.

921. M. R. Ramaswamy.—Recipe of snow cream appeared in July 1923, issue. Process of dyeing mercerized cotton appeared in June, 1924, issue.

922. Commercial Advertising Agency.—There is no paper mill at Calcutta, but there are two paper mills in Bengal whose registered offices are situated at Calcutta and these are Titagarh Paper Mills Ltd., Chartered Bank Bldg., Clive Street, and Bengal Paper Mills Ltd., 103, Clive Street, Calcutta. Umbrellas are manufactured by Nafar Chandra Atta, 43, Armenian Street; Tejpal Bredhi Chand, 7, Armenian Street; both of Calcutta. Papers are imported by Bharat Lakshmi & Co., Lohar Street, Bombay; Grace & Co., 10, Esplanade, Madras and Maharastra Trading Company., Kalbadevi Road, Bombay. For blankets enquire of Daulat Ram Gandhi, Gujranwala. Stationery articles may be bought of Nilmoney Haldar & Sons, 106, Radha Bazar Street, Calcutta; Bombay Stationery Mart, Victoria Bldgs., Parsi Bazar Street, Bombay, and Dass & Co., 60, Sikdar Bagan Street, Calcutta. For piece-goods and bed sheets enquire of T. R. S. Rajan & Co., 177-181, Abdul Rehman Street, and Shimwell & Bros. 20 Bank Street; both of Bombay.

923. S. Kazim Ali.—On radium watches a kind of paint called luminous paint is used, the recipe of which will be found in November, 1922, issue. Consult a physician.

924. Kanwar Bhan Ishwar Chandra & Co.—Hair dyes are not generally exported from India to England. Cigarettes are manufactured by W. D. and H. O. Wills 53, 54, and 55, Holborn Viaduct, London, E. C. 1 and Thomas Bear & Sons Ltd., London. For securing buyers advertise in the pages of newspapers and periodicals.

925. A. P. Pande.—Only book knowledge will not be sufficient for starting sugar industry. You shall have to undergo practical training in sugar factory. For books on the subject write to Chackraberty Chatterjee & Co., 15, College Square, Calcutta. Books on photography may be had of Thacker Spink & Co., 15, College Square, Calcutta.

926. H. M. B. Khan.—Tablet making machines may be bought of Calcutta Industries Ltd., 71, Canning Street, Calcutta.

927. Takhana Brothers.—Carnauba wax may be bought of Bengal Scientific Supplies Co., 29½, College Street Market, Calcutta.

928. Mg. Tinan and Ma Zan.—Glass sticks are manufactured by Md. Abdul Gaffar, 133, Canning St., Calcutta. Aniline dyes may be bought of Amin Chand Mehra and Sons 34, Armenian Street and Hansraj Vishram & Co., 13, David Joseph Lane; both of Calcutta.

929. K. P. Ipathi. For calendar pictures write to Mahila Press, 29, Pataldanga Street, Calcutta. An article on tapioca appeared in September, 1924, issue.

930. Takhana Brothers.—You should try some oil soluble for permanent colorization of boot polish. So you may use nankin brown instead of Bismark brown and see what follows. Nankin brown may be bought of Amin Chand Mehra and Sons., 34, Armenian Street, and Hansraj Vishram and Co., 13, David Joseph Lane; both of Calcutta.

931. M. Narasimha Rao.—Telugu equivalent of khesari is not known. Its Sanskrit equivalent is tripiti. One poa equals four chattacks. Padma madhu is a natural product obtained from honey comb in forests where lotus flowers abound. Telugu equivalents of matar are Gundusanighelu and patanlu. Telugu equivalents of moong are wuthulu and patcha-pessara. Keora water is a kind of per-

fumed water like rose water. Process of manufacturing keora water is the same as that of manufacturing rose water. An article on rose water manufacture appeared in last April issue. A glossary has been appended at the end of the book on Syrup Manufacture. As for vernacular equivalents of Chiranji etc., go through that glossary. Chiranji may be bought of Banshidhar Dutt and Sons, 126, Khangraputty, Barabazar, Calcutta.

934. Dr. T. C. Halder—Wants to know the address of Home Embroidery Machine Company of U. S. A.

935. Mehar Chand—Corks may be bought of P. S. Dutt and Brothers, 8, Ezra Street, Calcutta. Sponges may be supplied by B. K. Paul & Co., 1/3 Bonfields Lane, Calcutta. Cardboard boxes may be had of L. V. Varma, Cawnpore and Bengal Cardboard Box Manufacturing Co., 64/1, Machuabazar Street, Calcutta. Brass wire may be bought of S. C. Nundy & Sons., 13, Durmahatta Street, Calcutta and Roy and Friends 97, Clive Street; both of Calcutta. It will be advisable for you to have the packing boxes prepared locally as per order.

936. C. L. Kapur and Bros.—The following are some of the journals published in Germany: (1), Ubersee Post, 10, Solomonstrasse Leipzig, (2) Export and Import Review, 38/39, Krausenstrasse, Berlin and (3) Export Courier, Frankfurt-Main.

937. Badri Nath—The import of the articles mentioned by you is prohibited by customs department. Use various kinds of beauty cream available in the market and see the result.

938. S. Singh.—Please clearly explain your requirement. Knitting includes wide range of subject. Please write definitely whether you are interested in embroidery work or in knitting goods such as hosiery articles.

939. Syed Hadi Hussain.—An article on boot polish manufacture appeared in June, 1923, issue. Artificial butter is prepared in the following way. Margarine is melted at a very moderate heat, 20 per cent. of sour whey is added and the mixture thoroughly worked together until the whole is formed into a white froth. This is then beaten in a large vat until it con-

geals, by which the whey is separated and drawn off by a cock. From artificial butter prepare artificial "Ghee."

940. Pathi Kamayya Chetty.—Asafoetida is a natural products obtained from gum resin yielded by the root of *ferula alliacea*. It is mostly found in Persia, Afghanistan and Beluchistan.

943. Gopal Lall Sethi.—For industrial books enquire of Chackerbutty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

944. F. T. K. Viccajee.—Lancet is published at 423 Strand, London W. C. 2. For analysis you may write to The British Drug Houses Ltd., 22 to 30 Gresham Street, City Road, London W. 1.

947. Bodhan Bros.—For particular of certain plants of the Royal Botanical Garden write to the Garden Superintendent, Shibpore, Howrah. You perhaps mean solenium and laban (benzoate). Solenium may be bought of B. K. Paul and Co., 1/3 Bonfields Lane, Calcutta.

951. N. V. R. Swami.—For coffee washing machine enquire of the Planters' Stores and Agency Co., Ltd., 11, Clive Street, Calcutta. Wants to be put in touch with potato merchants of Calcutta.

956. Saiyid Azim.—Cardboard boxes may be bought of Kundu and Dass, 20, Gour Laha Street and Bengal Cardboard Box Manufacturing Co., 64/1, Machuabazar Street; both of Calcutta. For greased paper write to Ghosh Brothers, 63J, Radhabazar Street, Calcutta.

957. V. Gopalaswami Chetty.—The full address of J. D. Advani & Co., is Bunder Road, Karachi.

961. Swadeshi Cotton Mills Limited.—You may have your well water analysed by Calcutta Bactro Clinical Laboratory, College Street, Market, Calcutta.

963. D. Ramiya Pillay.—For Preserving sandal paste try alcohol. You may correspond with Schimmel & Co., Miltitz Leipzig and Heine & Co., A. G. Leipzig; both of Germany.

966. Ganga Vishnu Gupta.—Process of refining vegetable oils appeared in February and March 1921 issues of "Industry."

968. Nareshwaranandji.—Your idea is not workable.

971. S. S., Nagpur.—Reply has already been sent to you by post.

973. T. N., Bhimavaram.—For the required instrument try B. K. Paul & Co., 113 Bonfields Lane, Calcutta.

974. B. V. R. G., Tirupur.—Communicate direct with Prof. K. S. V. Nath, Magician, Camp Sivaganga.

976. D. S., Balaghat.—For Catalogue of furnitures write to Adam Sajan & Co., 7, Bow Bazar Street, Calcutta. For carpenters' tools enquire of Subol Chandra Dutt & Sons, 208, Harrison Road, Monohar Dass Chuck, Calcutta.

978. P. L. K., Ralangi.—We do not as a rule publish formulas in vernacular. Recipe of fountainpen ink appeared in August 1924 issue. There is perhaps no arrangement for organising regular art exhibition. But two art exhibitions are held at Calcutta every year—one organised by Government Art School, Chowringhee and the other by Society of Oriental Arts, Samabaya Mansion.

980. B. U., Chapra.—An article on ink manufacture appeared in November 1922, issue where you will find recipes of various kinds of inks. Your other queries appeared in the last issue.

981. T. T. M., Ahmedabad.—For dry blood enquire of Calcutta Tallow Supplying Co., 19 Tiretta Bazar Street, Calcutta. Wants to be put in touch with dry beef merchants of Rangoon.

983. V. C. W., Nizamabad.—For list of periodicals of Mesopotamia and Straits write to Calcutta Advertising Agency, 15 College Square, Calcutta.

984. J. K. T., Calcutta.—Process of manufacturing washing soda appeared in July 1924 issue. Efficient handling and expert manipulation will improve the quality of the product manufactured by you.

987. L. H. S., Sholapur.—Various kinds of waxes may be bought of S. M. De, M.Sc. Post Box 7851. Calcutta. Bismark brown and other oil soluble aniline dyes may be

supplied by Amin Chand Mehra & Sons, 34, Armenian St., and Mohamed Alibhoy & Co., 44, Armenian Street; both of Calcutta. For ink phials of required design write to S. K. Dey, 124 Shova Bazar Street and Satyacharan Paul, 194, Old Chinabazar Street; both of Calcutta. For turpentine enquiry of Dass & Co., 41B, Clive Street, Calcutta. Corks may be supplied by P. S. Dutt & Bros, 8 Ezra Street, Calcutta.

988. K. V., Chandragiri.—Yes, subscriber may write as many articles as he can but prizes are awarded according to the intrinsic merit of the article and not to volume of the article. Information regarding other enquiry is not available now.

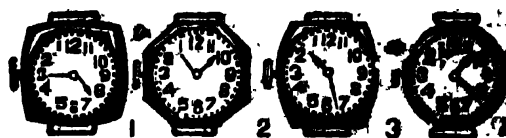
990. S. M. A., Madura.—An article on enamelling sign plates appeared in March 1923 issue which you please consult for detail information.

991. S. D., Ajmere.—The following are some of the technical schools of Calcutta: (1) Bengal Technical Institute, Jadavpur, Dhakuria, 24-Parganas; (2) Bengal Engineering College, Shibpur, Howrah and (3) Calcutta Technical School, 20/1 Lall Bazar Street.

992. G. R., Masulipatam.—Glass cement, as the very name implies, is both fire-proof and water-proof.

993. K. L. G. L., Mhow.—Spectacles may be supplied by General Capital Co., Inc. Mt. Vernon, New York, U. S. A; London Optical Co., 344-354 Gray's Inn Road, London W. C. and Asamma & Co., 16, Honcho, Nichome Nihbashi-Ku, Tokyo, Japan.

GOLDEN WRIST WATCH FOR RS. 6/8 ONLY.



These are of newest style watches fitted with high grade swiss mechanism. Glass crystal lined, figures Arabic or Roman. Their designs and Finish will satisfy the most critical test, and in appearance equal to sovereign gold very charming to look at and perfect time keeper guaranteed for 3 years, with leather or silk strap free.

SWISS WATCH CO., (1)
Bombay No. 3

995. S. O. R., Secunderabad.—Wants to be put in touch with second-hand wollen clothing dealers of America and England.

996. D. I. S. S. Rajshahi.—Refer your query to Khadi Pratisthan, 15 College Square, Calcutta.

997. P. M. R. N., Negapatam.—For catalogues of industrial machineries write to Oriental Machine Supply Agency Ltd., 20/1, Lal Bazar Street, Calcutta.

998 M. D. D., Madura.—You need not add tannin materials to copying ink. One gram equals 0.2705. dram.

999. M. A. E., Ernakulam.—For preparing tapioca flour and arrowroot you shall have to use grinding machines which may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lal Bazar Street, Calcutta. This industry is mainly carried on in Federated Malaya States.

1000. A. E. N., Colombo.—Oil of Kashmir boquet may be bought of B. K. Paul & Co., 1/3, Bonfields Lane, and Khoda Buksh & Co., 7, Kolutolla Street; both of Calcutta. The above firms will also supply other floral oils used in hair oils.

1001. I. B. J., Pachmarhi.—For knitting machines enquire of Economic Hosiery Mills Ltd., 55/2 Dharamatalla Street, and Indo-Swiss Trading Co., 27, Pollock Street; both of Calcutta.

1004. A. M. Y., Bombay.—Application of peroxide of hydrogen and ammonia to skin is injurious. These two chemicals may be bought of any chemist.

1009. M. N. K., Karimganj.—For training in civil engineering and other engineering, enquire of Bengal Engineering College, Shibpore, Howrah. For information regarding foreign education write to The Secretary, Students' Advisory Board, 7, College Square, Calcutta.

1011. B. J. Karachi.—Addition of a little coconut oil to mowah oil causes softness of soap.

1012. D. C., Dacca.—You may consult Henley's Twentieth Century Book of Recipes, Formulas and Processes to be had of Business

World Office, Belgachia and Hajar Ginish published from Basumati Office, 166, Bowbazar Street; both of Calcutta. Consult some physician.

1014. S. H. C. D. P., Allahabad.—Confectionery machines may be bought of Seth Deepchand & Sons, Old Sukkur, Sind.

1015. R. K., Aijal.—For hats enquire of Mohamed Ebrahim K. E. Aliar, V. S. & Co., 1/4, Municipal Bazar, Rangoon, Burma. Fancy goods may be supplied by M. E. Dadabhoy and Sons, 96, Dalhousie Street, and E. E. Aboo Brothers, 18, 26th Street; both of Rangoon, Burma.

1016. B. K. S., Multan City.—Shea or Lonicra glance as is known in Botany is a dense wiry undershrub found in the Temperate North-West Himalaya and Tibet, between the altitudes of 12000 and 16000 ft. Shea butter is obtained from shea seeds. Palm oils and kernels may be supplied by R. Hamilton & Co., Axim, Gold Coast, West African Colonies. Cotton seed oil may be supplied by Indian Cotton Oils Co., Ltd., Navasari, Humnum Street, Fort, Bombay.

1017. M. S., Palamcottah.—The following are addresses of some of the Consul-Generals of foreign countries in India: (1) Consul-General for Germany, 2, Store Road, Ballygunge, Calcutta; (2) Consul-General for Czechoslovak Republic, 28, Rampart Row, Fort Bombay, (3) Consul-General for Sweden, 21, Burdwan Road, Alipore, Calcutta, (5) Consul-General for Belgium, 8/3, Loudon Street; Calcutta, (6) Consul-General for Japan, 7, Loudon Street, Calcutta, (7) Consul-General for France, Wodehouse Road, Colaba, Bombay. For books on biochemistry write to Samanta Biochemic Pharmacy, 48, Shambazar Street, Calcutta. Refer your query regarding education by correspondence in Germany to Hindusthan Association for Central Europe, Mr. Jogendra Kumar Chowdhury, Wullenweberstrasse, 12, Berlin, N. W., 87, Germany.

1018. S. A. P., Kaira.—Tablet making machines may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lal Bazar Street, Calcutta.

1020. G. S., Kotah.—You may enquire of the following jewellers: Mungalabhai Hirachand Jayeri, 292, Sheikh Memon Street, Bombay; G. Ramchand & Co., 7B, Lindsay Street, Calcutta, and Baboomull & Co., Kashmiregate, Delhi.

1022. L. A., Irinjalakuda—Cashew nut is largely grown in the forest of South Indian coast lines. For syrup manufacture go through Syrup Manufacture published from this office.

1023. G. R., Kundala.—Exhibit the pictures in some local exhibitions whereby you may draw attention of public who may help you with finance or in other way. You may also put these pictures in some art galleries of your locality so that those pictures may have a wide publicity. Stones may be supplied by C. R. Bright and Co., 136, Broadway and Fred Cross, 17, Angappa Naicken Street; both of Madras.

1024. B. K. Y., Srinagar.—For learning tailoring write to D. N. Bakshi and Sons, Abbottabad, U. P.

1025. V. D. B., Lahore.—Macerate mercury and copper sulphate in equal proportion when the product will be a pasty stuff and afterwards it will solidify.

1027. K. B. S., Calcutta.—For the required paddy milling machines write to Marshall Sons & Co., 99 Clive Street, Calcutta.

1028. V. P. P., Marsanda.—Process of preparing nitric acid from lemon juice appeared in August, 1921, issue.

1030. S. V., Narasapur.—For sheet metal machineries write to Messrs: Taylor and Challen, Birmingham, England, Yarns may be supplied by Ashworth and Wild Ltd., 108, Postland Street and Britannic Textile Co., Ltd., 14/18, Lloyd Street; both of Manchester.

1032. D. S. H., Sanikatta.—Yes, all the formulas will produce fast colour. Dyes may be bought of Amin Chand Mehra and Sons, 34, Armenian Street and Hansraj Vishram & Co., 13, David Joseph Lane; both of Calcutta. Silk yarn may be bought of Home Industrial Association, P. O. Kamakhya, Gauhati, Assam.

1035. M. M. B., Bombay.—A formula of

Glauber's Salt appears elsewhere in this issue.

1036. M. Z. H., Lucknow.—For pressing wool you may enquire of Kashmir Stores, Katra Hari Singh, Amritsar; Mathradas Tikamchand, Bikaner and Virendra Kumar Surya Prakash, Daulatganj, Lashkar, Gwalior. For bristles enquire of Hollingshurst & Co., 3/6, Hare Street, Calcutta; Allen Bros. & Co., Hornby Road, Fort Bombay and Indian Bristles and Lard Supply Co., Tangra Road, Entally, Calcutta.

1038. K. S., Rewa.—Addresses you require will be found in Thacker's Indian Directory to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta.

1039. K. G. S., Gurunaran.—In washing cloths apply laundry soaps.

1041. G. M. S., Bagalkot.—Envelope making machines may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta. Now envelope manufacture will not be so profitable as cheap envelopes are imported from foreign countries, moreover, supply is far in excess of demand.

1042. K. U., Bombay.—Velvet and velveteens may be supplied by Louis Alfred, 57, Newton Street, Manchester; Crompton Co, Providence, Rhode Island, U. S. A., and J. Osawa & Co., Ltd., Sanjo, Kobashi, Kyoto, Japan. Picture frames are manufactured by International Picture and Show Card Framing Co., Ltd., 37, and 41, Bolton Street, Liverpool, England and Y. Tamaki and Co., 13, Ichome, Ginza, Kyobashi-ku, Tokyo, Japan. Addresses of cardboard and paper dealers will be found in May, 1925, issue of "Commercial India," the sister journal of "Industry." Tab-

THE SECRET OF SOAP MAKING.

It will teach you how to prepare at home coloured and scented Toilet Soap, Glycerine Soaps, Soaps like Sunlight Soap, Washing, Laundry and other useful soaps with the least trouble and expense. The author is a manufacturer for years and with success. Price Rs. 2 only. V. P. charges extra.

THE HINDUSTHAN SOAP WORKS,

Publishing Dept. No. 1,
P. O. Nowasahar, Jullundur.

let making machines may be supplied by Kampremiere Maschinen, Gesellschaft, Gueisensstrasse, 67, Berlin, S. 61, Germany.

1044. K. A. K., Ootacamund.—Process of preparing camphor appeared in November, 1923, issue of "Industry."

1045. P. M., Baroda City.—Yes, you may start soap, ink and match industries on a small scale. Many factories equipped with indigenous machines have been started all over India and they are now in a flourishing condition. For starting ink industry you need not secure any machine but if you intend to manufacture ink tablets you will have to procure a tablet making machine which may be supplied by Oriental Machinery Supply Agency, Ltd., 20/1, Lall Bazar Street, Calcutta. Soap making outfits may be bought of the above firm. Match machines may be had of Bhowani Engineering and Trading Co., 122/1, Upper Circular Road, and Bengal Small Industries Co., 91, Durga Charan Mitter Street; both of Calcutta. Practical knowledge is always better than book knowledge but if you cannot have any practical training read good books on the subjects and experiment according to the direction given in the books. But you must try one at a time. For books on industrial subject write to Chackraverty Chatterjee and Co., Ltd., 15, College Square, Calcutta.

1048. B. D. S., Calcutta.—You may go through Popultry Keeping in India by Isa Tweed to be had of Thacker, Spink & Co., 3, Esplanade East, Calcutta. Can supply tortoise shell.

1049 K. C., Colombo.—The following are some of the insurance companies of Calcutta:—(1) National Insurance Co., Ltd., 7, Church Lane; (2) Light of Asia Insurance Co., Ltd., 6, Old Post Office Street; (3) East and West Insurance Co., Limited, 84A, Clive Street; (4) New India Assurance Co., Ltd., 100, Clive Street; (5) Phoenix Assurance Co., Limited, 28, Dalhousie Square, (6) India Equitable Insurance Co., Ltd., 1, Lall Bazar Street Calcutta and (7) Himalaya Assurance Co., Ltd., 7, Bowbazar Street.

1050 S. R.P., Ayakudy.—Powdered tobacco stems or stalks are used in adulterating snuff, sugti, zarda and sometimes cigarettes. For patent medicines try Martin and Harris,

8, Waterloo Street, Calcutta. Can supply castor seed and tobacco stalks.

1057 J. R. R., Rohtak.—Please communicate direct with the magician whose complete address has been published.

1059 N. U. W., Bantwal.—For the required instrument try B. K. Paul & Co., 1/3, Bonfields Lane, Calcutta. For your other enquiries consult a physician

1060 S. P. W., Kurunegala.—For wood printing machines write to K. M. Banerjee, 133, Canning Street, Calcutta. Wood working machines may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta. Stationery articles may be supplied by King Bros., 15, Bury Street, St. Mary Axe, London E. C. 3 and Charles and Sons, 10, Patternoster Square, London E. C. 4. Fancy goods may be supplied by Jackson Henry & Co., 9, Long Lane, Aldersgate Street, London E. C. 1 and Tardrew Thomas & Co., 24, Aldermenbury, London, E. C. 2.

1061 S. B. C., Seoni.—Soaps may be bought of Calcutta Soap Works, Ltd., 15, College Square, and M. Framrose & Co., 9, Bank Street, Fort, Bombay. Tobacco for "bidis" may be bought of Moolji Sicka & Co., 51, Ezra Street, Calcutta. Matches may be supplied by Lalchand Brothers, Match Depot, 33A, Central Avenue, and H. Rashid & Co., 15, Zakariah Street; both of Calcutta. Electrical goods may be had of B. M. Singh and Son, 150, Lower Circular Road, Calcutta. Fancy articles may be bought of K. B. Nan, 233, Canning Street, Calcutta. Scents may be bought of Sickri & Co., 58/4, Canning Street, and B. K. Paul & Co., 1/3, Bonfields Lane; both of Calcutta. Oils may be bought of Panch Cowrie

German Aniline Dyes, and Chemicals

of the well-known manufacturers

Messrs. Leopold Cassella & Co.,

Largely consumed by big Industries, such as

Jute, Silk, Cotton, Wool, Leather,

Paper, Inks, etc.

—: STOCKISTS :—

Messrs. Fazlehusein & Brother,

44, Armenian Street, Calcutta.

Tat., Mir Bahar Ghat Street, Barabazar, Calcutta. Motors, cycles and accessories may be bought of Wellington Motor and Cycle Co., 313, Hornby Road, Fort, Bombay. Papers may be bought of Ghose Brothers, 63½, Radhabazar Street and Bholanath Dutta and Sons, 134, Old China Bazar Street; both of Calcutta. Stationery goods may be supplied by Nilmoney Haldar and Sons, 106, Radha Bazar Street and Dass & Co., 60, Sikdar Bagan Street; both of Calcutta.

1062. U. M. C., Ambala Cantt. For labels you may write to Calcutta Fine Art Cottage, 76, Dhurruntollah Street, Calcutta.

1063 N. L. S. W., Trivandrum.—For particulars regarding picture frame moulding go through an article on the subject which appeared in August, 1923, issue of "Industry." For carpenter's tools enquire of N. G. Mittra & Co., 135, Chandney Chawk, Calcutta.

1064 G. G. G., Khargone.—Wants to be put in touch with dealer in leaf-sheets used for taking food on festive occasion in Madras side.

1066. S. D. G., Shirpore.—Cracks in boots cannot be cured. Tennis racquets may be rebuilt from the local makers. They can be kept in shape by iron frames available. For preserving rubber articles try oil and grease. Woollen goods can be freed from insects with a liberal use of naphthalene. Rolled gold articles should be rubbed with chamois leather immediately after wearing. Those should also be cleaned with rouge occasionally. Your other enquiries are receiving our attention.

1067. E. C. W., Alleppy.—Woollen goods are manufactured by Kashmir Weaving Co., Srinagar, Kashmir. Coir mattings are imported by S. K. Banerjee and Co., 52, Bowbazar Street, Calcutta.

1068 S. N. H., Mergui.—For piece-goods enquire of Chunilal Sewchand Roy, 152, Cross Street, Calcutta; Jainarain Ram Sarup, 44, Katni Bldg, Kalbadevi Road, Bombay and Chapsialmarsji & Sons, Bunder Road, Karachi.

1069. B. L., Daltonganj.—Wants to buy a laughing camera.

1070 F. D. C., Fyzabad.—Your enquiry is unintelligible; please explain it more clearly.

1071 S. W. K., Narayanpeth.—Try Anglo-Telugu dictionary for English equivalents of Telugu words.

1072 B. P. S. S., Mysore.—Send your paper for review.

1073 V. M. C., Bombay. Addresses of trade journals of Germany appear elsewhere in these columns in this issue. Important trade journals of Czechoslovakia are: (1) Czechoslovakia Trade Journal P. O. Box 476, Prague, and the Czechoslovak Mercury P. O. Box 77, Prague. Addresses of other trade journals you require are not known to us.

1075 H. V. S., Bangalore.—Consult a cinema-tograph expert.

1076 D. D. R. R. M. K., Hoshiarpore.—Codes and dyes may be bought of Amin Chand Mehra and Sons, 34, Armenian Street, Calcutta. You may consult Scientific America, New York, U. S. A. Refer your query to High Commissioner for India, Grosvenor Garden, London. Paints and varnishes may be bought of Jay Gopal Datta and Brothers, 40 Clive Street and Ram Sagar Singha and Co., 41, Clive Street, both of Calcutta.

1077 S. K., Colombo.—In place of tea and coffee you may take warm milk.

1079 K. J. N. S., Jaipore City.—Printing on metals requires a special form of litho printing which again requires expert knowledge on the subject.

1080. V. S. C. Mandalay.—Fish oil may be bought of H. C. Farnadez and Co., Mangalore, Paul Vayer, Mead Street, Nagercoil and Fisheries Dept., Madras. An article on extraction of vegetable oil appeared in June, 1925 issue. Castor oil may be bought of Mathamsetty Krishna Row, Bezwada and Rose & Co., Cocanada, P. O. Box No. 30.

1083 K. L. M., Howrah.—Sage is generally known as Bengal sage, its Hindi equivalent is "kafur-ka-pat."

1084 K. B. T. C., Srinagar.—For used film enquire of J. F. Madan & Co., Ltd., 5 Dharamtolla Street, Calcutta. For guttapercha sheets used in motor cars write to Wellington Motor and Cycle Co., 313, Hornby Road, Fort, Bombay.

FRESH TABLE BUTTER.

SPECIAL
TRADE QUOTATIONS
TO
BONAFIDE MERCHANTS.

Apply:—

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NOTICES AND REVIEWS.

A Patent Medicine.

"Amrutam" is the name of patent medicine prepared by Messrs. Amrutaratna Karam 45, Bunder Street, Madras

Ink Tablets.

On dissolving the ink tablets made by Messrs. A. R. Qureshi & Son, Ambala City a good writing fluid will be obtained.

Writing Inks.

Writing inks of excellent quality are manufactured by Messrs D. N. Kapur & Co., P. O. Box 105, Lahore.

Forest Products.

Genuine forest products such as pure honey, white zeera, etc., can be supplied by the Krishna Works, G. B. Shivpuri, P. O., Gwalior C. I. Krishna Balm, Electro wonder powder, etc. may also be had of them.

Toilet.

The coconut oil of the Ganga Chemical Works, Katra Bazar, Saugor C. P. has given us complete satisfaction. It is pure, medicated and perfumed.

Buttons.

Buttons—at once nice and cheap—are made by Mr. P. Kanakaraja, Bridge Road, Cocanada. Such home industries must be supported.

Boot Cream.

Messrs. N. Beycene & Co., of Gharialdanga, Dist. Rungpore are manufacturing boot cream of good quality known as "Lamprey."

Tooth Powder.

By the use of Dantasakti—a tooth powder prepared from rare ingredients by Mr S. K. Chatterjee, 15, Bagbazar Street, Calcutta—much of the dental troubles may be avoided.

A Folding Chair.

"Dardanas" is the name for a kind of folding chair available from Messrs. Mahomed-bhoy Jivabhoj & Co., Nizam Street, Bombay No. 9. It possesses several advantages in that it is at once light, strong, collapsible and therefore handy.

Hair Oils.

We acknowledge with pleasure the receipt of a sample phial of Kamalata Hair Oil from Mukhiyaji Ayurvedic Pharmacy of Muttra, U. P.

Messrs Rajabhoj Bros. of C. 4 Naik Road, Nagpur City have also sent us a phial of their Kanchani Hair Oil, cooling and fragrant.

A Useful Chemical.

It gives us great satisfaction to note that such a useful chemical like sodium silicate has been prepared by the Bombay Chemical Works, 135/2, Manicktala Main Road, Calcutta and that by following instructions given in "Industry". We wish the firm every success and a wide market for their product.

An Urdu Monthly.

Kshatriya Circular, Lahore.—Edited by Shiv Dass B.A. B.T. Annual subscription, Re. 1 It is the organ of the All-India Kshatriya Sabha Central Committee. The March number contains a Rozgar (Industrial) Supplement, dealing with the middle-class unemployment, agricultural occupations, etc.

Two Technical Manuals.

Boot Polish Manufacture: By J. D Narula, Principal Hawaid College of Commerce, Rawalpindi, Punjab. Pages 82.

The book under review will be found extremely useful to prospective manufacturers of leather dressings. The subject matter has been dealt with exhaustively. Besides methodical treatment of the uses of the appliances, properties of the ingredients, description of the processes; numerous recipes and formulas have been added. In fact it is a very practical and valuable technical primer.

Typewriting Simplified.

By Messrs. J. D Narula and C. L. Varma, Address as above. Pages 70.

It will not be too much to say that even a novice can learn the art of typewriting with the help of this manual. The lessons are explained lucidly and the instructions are given elaborately. Further more the judiciously selected exercise at different stages will make the acquisition of the art easy.

Trade Enquiries.

[To communicate with any party write him direct with name and address given below.]

960 B. D. Bugwadi, P. O. Box No. 15, Akyab, Lower Burma—Wants to be put in touch with dealers in second-hand woollen clothings, blankets, and overcoats.

970 Upendra Chandra Paul—Badarpurghat, Siatic Forest Office, Sylhet.—Can supply pine-apples in very large numbers.

1002 Bramhappa Tavanappanavar, Davangere. Wants to be introduced to dealers in neem oil.

1006 P Bhaskaram and Brothers, Rajahmundry.—Desire to be put in touch with dealers in magic wire and tape, machine for preparing clarionet reeds and suppliers of Indian drugs and roots.

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The August issue of **INDUSTRY** which will appear on the last day of the month will contain articles on Flour Hilling, sinking Tubewell, Glass Blowing, etc, in addition to the usual features such as New Ideas, small Trades, Formulas. Any friend of our subscribers may get a copy as sample on application to the Manager, **INDUSTRY**, Shambazar, Calcutta.

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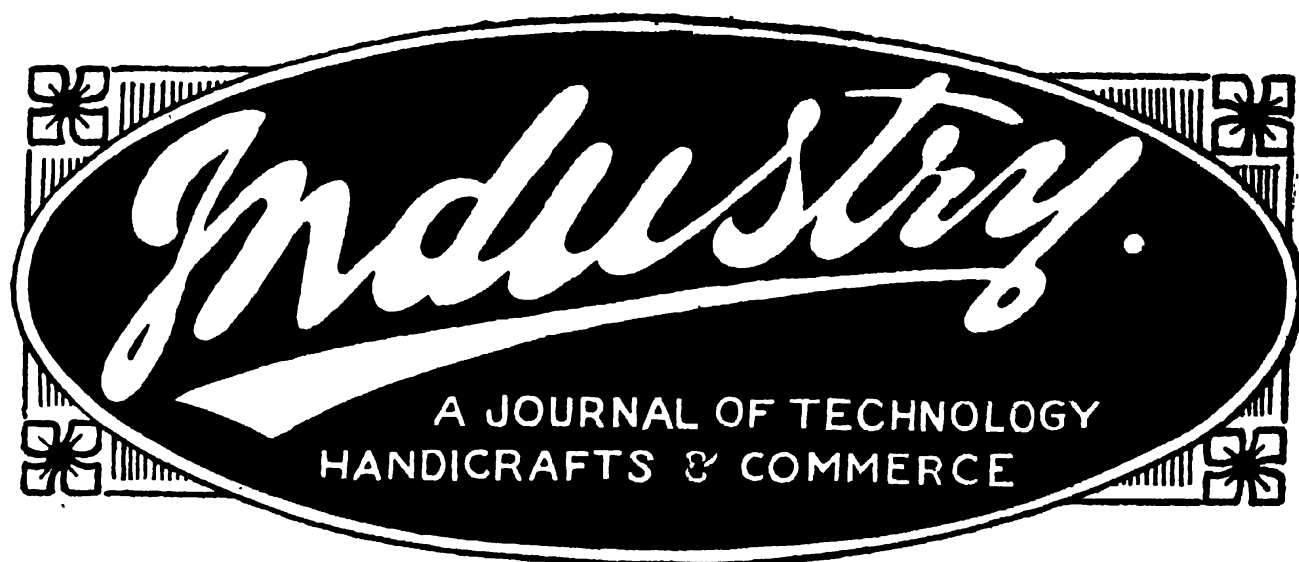
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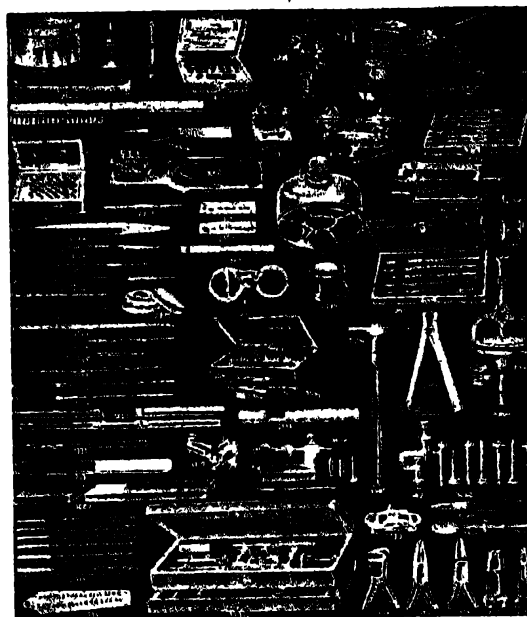
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Industry

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NO. 185

When You Can Not Make Up Your Mind.

THAT is the worst time of your life when you can not make up your mind. To be indecisive when the situation demands you to be quick is a terrible trial. This is the sphere of life when the seed of failure is sown.

There are men who are naturally indecisive—they have as it were a paralysis of indecision. Their mind is an eternal to-do-or-not-to-do class. Are you one of them?

Quick decision concerning all matters of life and business is a quality that foreshadows success—indeed, but this is not always the case. But indecision soon leads to ruin—as surely as anything else. Cultivate the habit of prompt decision. This makes success easier, nearer, safer.

But what you should do—so that the habit of prompt decisions may be yours. If your mind vacillate when anything comes to you for final decision first cultivate the habit of giving brain

proper rest. Never try to decide anything say after 5 or 6 o'clock in the evening. You should give your brain a rest from fits of indecision that torment you all day long.

Secondly, make it a point not to reconsider a matter, make the first decision final. That would give you habit of prompt decision. If, however, the acceptance of the first decision troubles you and launches your brain in dead heat toss a coin—"Heads I do; tails I do not". This may serve as first step.

Begin your daily work by making a decision on some matter that has been delayed. This will give you a good running start for the day.

Never read any morbid books nor go to any horror plays. Learn to laugh more and to enjoy the society of jolly companies. By so doing you can gradually overcome the mental diseases of indecision which ruins both happiness and success.

FLASHLIGHT OF CHANCES.

I am inclined to enquire of my reader whether he is employed in otherman's job or doing something on his own account. For in either case there is a chance of losing the job. And in that case and suppose you are discharged from your work to-morrow what would you do?

God forbid that such mischance comes to any of my readers. But I wish that my readers will always be ready for any emergency—fitting the brain to any job; A new trade may be brought into being even on the smallest scale; if the ideas are in the brain.

Every one indeed takes advantage of other fellow's ideas to some extent, sometimes improves on them and adapts them to one's own use. Money-making ideas are sought for everywhere. The natural inclination of every man leads him to be independent even with a little side line of business. You must be ready with many plans that will start you on to the road to independence

Decide on a plan of action in accordance with the means you have still under your control. Go to it with a determination to win. Stick to it with a determination to win; let that determination keep on increasing and you will win.

Failures in life are mainly due to want of business habits—to incapacity to manage, to want of methods, to lack of thoroughness in the work in hand. Just try to improve business habit in yourself—study methods—better system, and better organisation in general. No slovenly system backed up by dishonest, untidy, methods are the ways to achieve any real and enduring success.

Of course there are many causes which lead to business failure. When you study the explanations from the bankrupts themselves the chief cause of failure would appear to be want of money. But the question is why you go to expand your business without equally expanding your capital. That is want of prudence. When you have the methodical business habit cultivated in you, you would not be subject to such want of prudence. Want of purpose is another cause of business failure, but above all things is want of method.

Never worry yourself. Worry in business is generally coupled with disorder, slovenly system, uncontrolled methods. The victim of worry is ever on the verge of some catastrophe which he has not the strength of intellect to account and, if he escapes, it is more by luck than by good management.

To get order is the first artery of business success. That depends upon your capacity to advertise your ware, either establishing yourself in suitable place of business, or availing yourself of the services of competent salesmen or pushing yourself to the forefront by written advertisements. But to execute the orders to the satisfaction of the customers is another thing.

Satisfaction of the customers must be your aim in execution of all orders—not your profit or convenience. Satisfied customers always bring new ones. But this satisfaction depends essentially upon methodical treatment of all orders. Your cultivation of congenial business habits gives you control over this methodical treatment. And when your mind is prepared with ideas you will not need other pushing excepting from your own habits to make them earn money even if you are out of employment or of business once.

BEE.

FLOUR MILLING INDUSTRY.

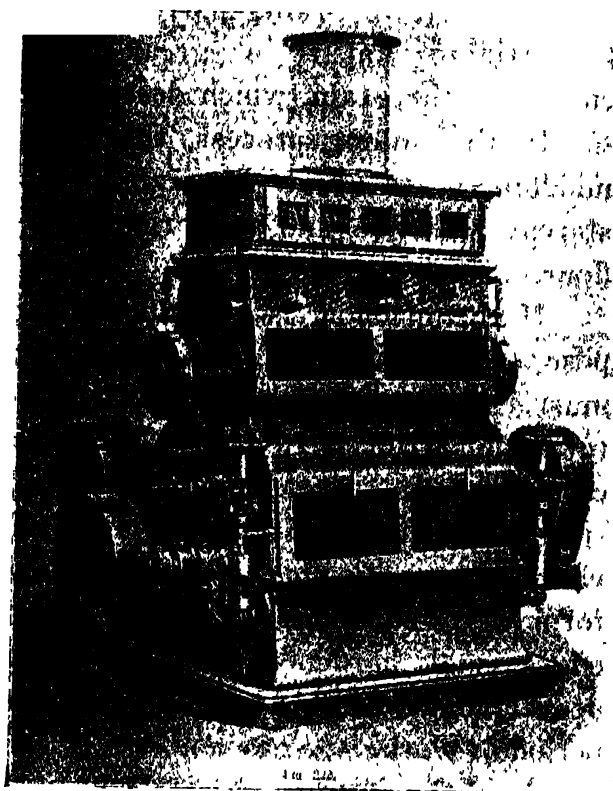


Fig. 1. Complete Roller Mill.

MACHINERY DESCRIBED.

FLOUR is obtained from wheat by the process of milling. Therefore to obtain pure flour the wheat must be freed from all impurities. Besides being impure through admixtures of vegetable origin, the grain acquires impurities of organic and mineral substances, and particles of metals. These are removed by special machines known as separators and sifters.

Pieces of metal if present are separated by magnetic separators. Large and small impurities are sifted according to sizes. During the sifting process the product is made to travel over the bolting surface. This is done by means of moving sieves, which compell the grain to travel in the direction defined

by the kind of motion peculiar to the sifting surface. The machine for this purpose are generally those (1) with vibratory motion, and (2) with rotary motion.

After the removal of foreign matter from the grain, it has to be cleaned of the dirt that has stuck to it, and the husk, smut and beard. The dirt generally lies in the grooves. Husks do not contain any nutritive substance; on the other hand they darken the colour of the flour. The modern process of removing the dirt and husks may be divided into two categories: (1) the dry process of scouring, and (2) the wet process. In the former case the working parts of the machinery either by friction or by striking, oftenest both by strokes and friction of rough surfaces remove the dirt, shells, germ coat, and beard, or hairs covering the grain. In the latter case the dirt is at first removed by washing and then both the husk and the remaining dirt are removed by dry scouring. The scouring of grain in its turn is best carried out by means of rough surfaces.

At the next stage the grain is damped. For if the offal particles are reduced to a fine dust together with the stock it is impossible to extract them subsequently. But on the contrary if the bran coat is broken up into particles larger than the flour, they may be removed by bolting. It is of great consequence, therefore, that the process of milling should be performed so as to leave the bran coats whole. If dry

grain is sent through the **milling** process, the dried bran is very easily ground to dust which mixes with the flour. On the other hand by dampening the bran it becomes more elastic and offers greater resistance to pulverisation than the starch mass of the grain. There are two types of apparatus for conditioning the bran: (1) The wetting apparatus, (2) the apparatus for steaming the grain. So much for the preparatory processes.

WHEAT GRINDING.

In fundamental principles of grinding wheat must first be understood. The different types of milling machinery fall under the following categories according to the principles of action of their working organs upon the product under treatment:

- (1) Cutting (chipping off) machines.
- (2) Pressing (crushing) machines.
- (3) Machines acting by free impact.

The machinery of the first principle of reduction requires two working parts moving in opposite directions, or in the same but with different speeds.

The second principle of action of the working parts upon the product treated is never met with in its pure form, because those parts move with a velocity different to that of the product, and the grain, besides being crushed looses particles that are chipped off not by the strain of the cutting faces, but through friction. This process is called tritulating the product. In this case, too, the working parts may be moving either in different or in one and the same direction.

The third and last principle of reduction, the free impact, is achieved by machinery, the working parts of which by striking impart a great kinetic energy to the grain, which destroys it.

In the milling process, the branny middlings are first separated from starchy semolina and then reduced to flour.

If the machine is to fulfil its purpose successfully, the working surface, must be sharp and rough. Hard natural and artificial stones, coarse grained and porous, are a good material for surfaces of this kind; as well as metals which are easily shaped to the desired form of a surface with sharp cutting edges, and hardened to a necessary degree, and thus able to stand a lengthy period of work.

Now the form of the working parts of the grinding machinery is defined either in the shape of chisels or that of a part of the surface with a large coefficient of friction in respect to the grain. If a mass of whole grain or particles is

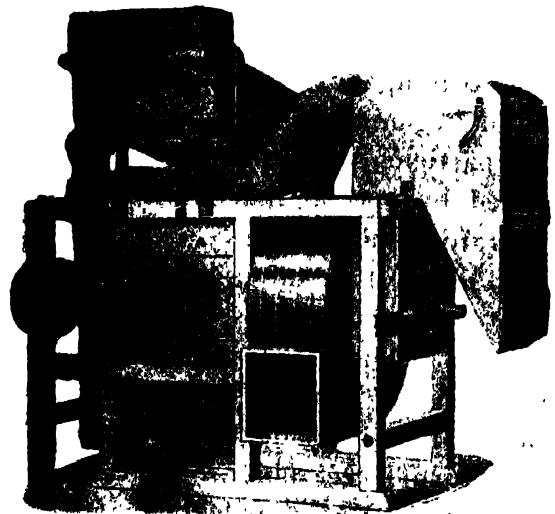


Fig. 2. Wheat Scourer and Polisher.

to be triturated unintermittently, the chisels are arranged one after the other, thus forming a surface covered by uniformly placed chisels. In referring to those working organs in machinery of the first and second principles, those part surfaces should be named. The working organs of the machinery based on the third principle present separate elements adopted for striking generally metal pins.

Two kinds of working surfaces, viz. cylindrical and flat are here selected for consideration. There being two working surfaces necessary for treating the product, there can be two possibilities as to the degree of their activity: (1) one of the working surfaces is fixed, the other moveable (2) both are moveable

Again, as regards the arrangements of the surfaces, there can also be two cases: (1) working surfaces having a common axis of rotation, and (2) surfaces with parallel axes of rotation. The period spent by the grain between the working surfaces is of the greatest consequence, because the degree of uniformity of the triturated particles depends on it. In this respect the working surfaces are divided into two categories: (1) surfaces of reiterated action, and (2) surfaces acting once.

As examples, millstones, disintegrators, etc., i.e., machinery having a common axis of rotation belong to the category of machines with reiterated action of the working surfaces. While roller mills, i.e., machines with parallel axes of rotation of the working surfaces belong to the second category.

MILLING PROCESS.

After being cleaned the wheat berry is split and broken up into increasingly fine pieces by fluted rolls or "Breaks". Rolls measure up to 60 in. in length and are made of chilled iron, and for the breaking of wheat are provided with grooving cut at a slight twist, the spiral averaging $\frac{1}{2}$ in. to the foot length. The grooves have sharp edges as their function is to cut or shear, not to flatten and crush. Rolls may be set either horizontally or vertically. The feed is of the utmost importance to the correct working of a roller mill. The material should be fed in an even stream, not too thick, and leaving no part of the roll uncovered.

The products of the break rolls are treated by what are known as scalpers,

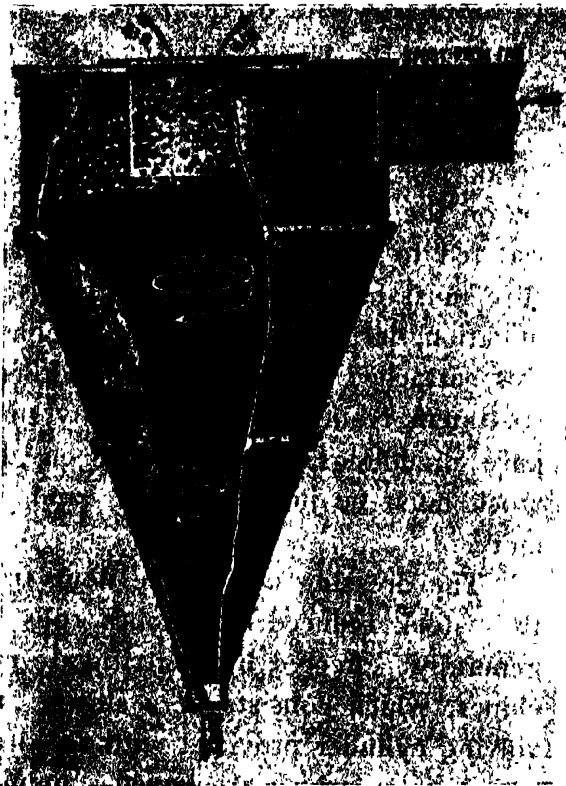


Fig. 3. Dust Collector.

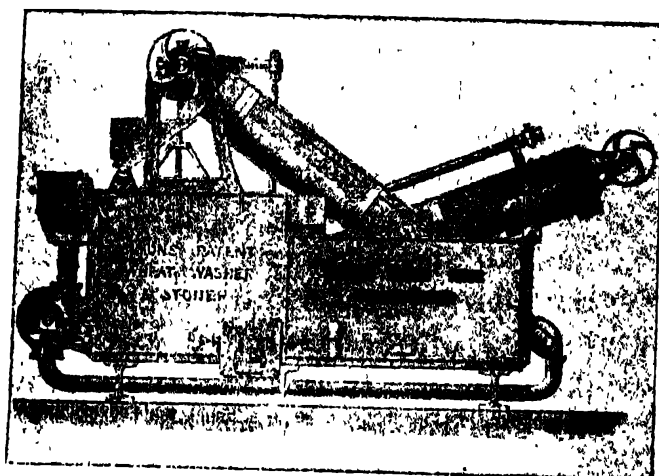


Fig. 4. Wheat Washer and Stoner.

which are simply machines for sorting out these products for further treatment. Flat sieves is the favourite form of scalper on account of its gentle action. The break products are usually separated on a sieve covered with wire or perforated zinc plates. Usually two sieves are in one frame and are run at a slight incline. The troughs of the top sieve fall on the sieve below, while the rejections or overtails of the first sieve are fed to the next break. The product that has passed this sieve, are graded by the next sieve, the tailings going to a purifier, while the troughs may be freed from what flour adheres to them by a centrifugal dressing machine and then treated by another purifier.

The object of the purifier is to get away from the semolina and middlings as much impure matter as possible, that those products may be pure, for reduction to flour by the smooth rolls. The purifiers are worked on the principle that the more valuable portions of the wheat berry are heavier, than the less valuable particles such as bran and

fibrous bodies, and a current of air is employed to weigh these fragments of the wheat berry as in a balance and to separate them while they pass over a silk-covered sieve. To this end the semolina or middlings are fed on a sieve vibrated by an eccentric and set at a slight downward angle. Upwards through this sieve a fan constantly draws a current of air, which raising the stock upwards allows the heavier and better materials to remain below while the lighter particles are lifted off, and fall on side platforms, on channels, whence they are carried forward and delivered separately. The good material drops through the meshes of the silk, and is collected by a worm. The tailings of a purifier do not usually exceed 10 to 15 per cent. of the feed.

From the purifier all the stock except the tailings go to the smooth rollers to be made into flour. Unlike the break rollers which operate by cutting action the smooth rolls press the material fed to them into flour. This pressure must be applied with great discrimination, large semolina with impurities attached requiring quite different treatment from that called for by small pure middlings. The pressure on the stock must be just sufficient and no more.

The dressing out of the flour from the stock reduced on smooth rolls is generally effected by centrifugal machines, which consists of a slowly revolving cylinder provided with an internal shaft on which are keyed a number of iron beaters that run at a speed of

about 200 revolutions a minute, and fling the feed against the silk clothing of the cylinder. What goes through the silk is collected by a worm conveyor at the bottom of the machine.

OPERATION AND PRODUCT.

Flour is a finely ground meal obtained from wheat. Ordinary white flour of which there are a number of grades is composed of the interior portion of the wheat kernel subjected to processes of pulverization and purification of the wheat kernel subjected to either a portion or all of the bran, germ, and other offal parts are removed. When the entire wheat kernel is ground into a meal, it is called graham flour. When a portion of the bran is removed but the germ and fine bran are retained, the product is called purified graham or entire wheat flour.

The roller process of flour production consists of the gradual reduction or pulverization of the floury portions of the wheat kernel between corrugated and smooth steel rolls and of the purification of the product by means of aspirators, sieves, and bolting cloths. During the process of milling, the granular middlings undergo gradual reduction and are passed from break to break. At each break or grinding, the fine flour is removed by bolting, the middlings are separated and passed to other rolls and tailings are subjected to further reduction. Before passing to the rolls, the wheat is screened to remove loose dirt, etc., and occasionally washed to remove adhering dirt and debris; then dried or tempered with steam, as may be necessary in order to

more easily effect reduction. The first break simply flattens the kernels after splitting them in halves along the longitudinal groove. The germ is pinched off by the rolls and is readily separated. The flour passes automatically from

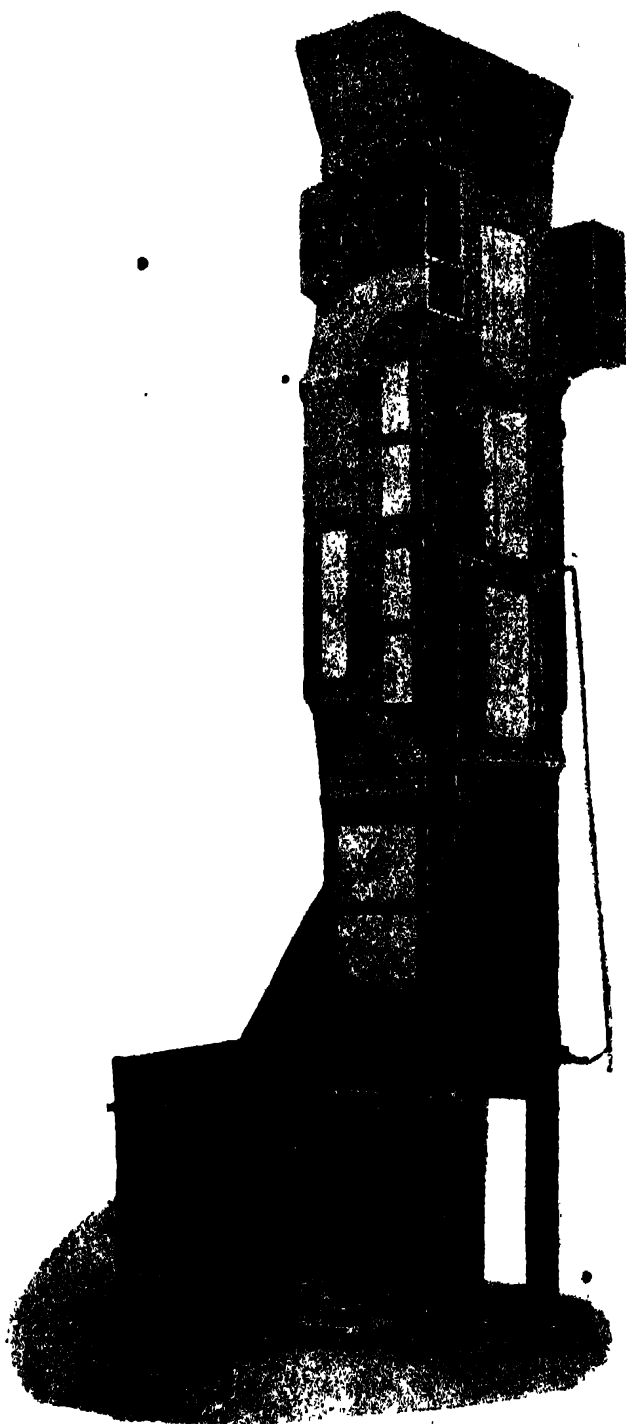


Fig. 5. Dryer.

one break or set of rolls to another. Each break is regulated so as to pulverize a little finer than the preceding one. Each stream is purified by passing through reels and by subjection to aspirators which remove the fine dust and dirt by suction. Finally the various streams are blended so as to form different grades of flour. In large mills, the cleaned wheat is usually elevated to the top of the mill and then passed on the rolls, and the various streams, blended in such a way that the final flour product is obtained after being separated into 40 or more separate streams. The introduction of the roller process of milling has made it possible to use varieties of wheat from which high grade could not be made by the old stone process. By the roller process of reduction, the granular middlings which were formerly excluded from the flour are now reduced and added to the patent grades of flour. About 75 per cent. of the cleaned wheat is returned as merchantable flour, 72 per cent. being straight grade or ordinary white flour. In ordinary milling, the grades are as follows: (1) First patent, (2) Second patent, (3) Straight, (4) First clear (5) Second clear. First patent flour is the highest grade manufactured. Its gluten has greater power of expansion and absorbs more water than that from any other grade. First patent flour produces the whitest and largest sized loaf of bread. Second patent flour is similar to first patent, but the bread is slightly darker in colour and the gluten does not possess quite so high a power of expansion. First clear

grade flour is obtained after the removal of the first and second patent grades. The flour is slightly darker in colour and produces smaller sized-loaf than the patent grades. Second clear or low grade is the name given to a small amount of flour obtained after the removal of the first clear. About 12 per cent of the cleaned wheat is recovered as first clear flour and about 3 per cent. as second clear or low grade. When the wheat is milled so that the first and second patents and the first clear are all obtained as one flour, the product is called straight grade. This is the flour that is most extensively used for bread-making purposes. Straight flour is the sum of the first and second patents and the first clear.

Price varies with three factors: amount of purchasable commodities, and the rate at which the purchasing power is exercised.

The organising faculty is a rare gift in a business man, and to be advantageous, it must be combined with long experience and excellent judgment, or the commercial result cannot be satisfactory

Without profits which are steady and sufficient in amount, business integrity cannot be maintained, and expansion and progress are impossible. The three essential factors that govern profits in business are careful buying, elimination of waste and economical selling and distribution.

THE ART OF GLASS BLOWING—V.

BULB AT CENTRE OF TUBE.

TAKE up a long piece of the $\frac{1}{2}$ in. tube, and hold it in a slanting position, so that one end may rest against the bench; grasp the tube with both hands and rotate it, then with the large flame play upon the point A. (Fig. 26). When this part becomes thoroughly heated, withdraw the tube from the flame, and still holding it in the same inclined position, proceed to draw away the upper part, leaving a long capillary tube, A. (Fig. 27). Seal this off by holding for a second in the flame. Next allow the blowpipe to play upon the part B. and when again sufficiently heated draw away a second time, producing another capillary portion upon the tube. By sealing off this a tube will be obtained as in Fig. 28.

It is necessary to get these tubes concentric with the larger one, so that when drawing them out care should be taken to effect this result, otherwise a decent bulb will not be so easily blown afterwards.

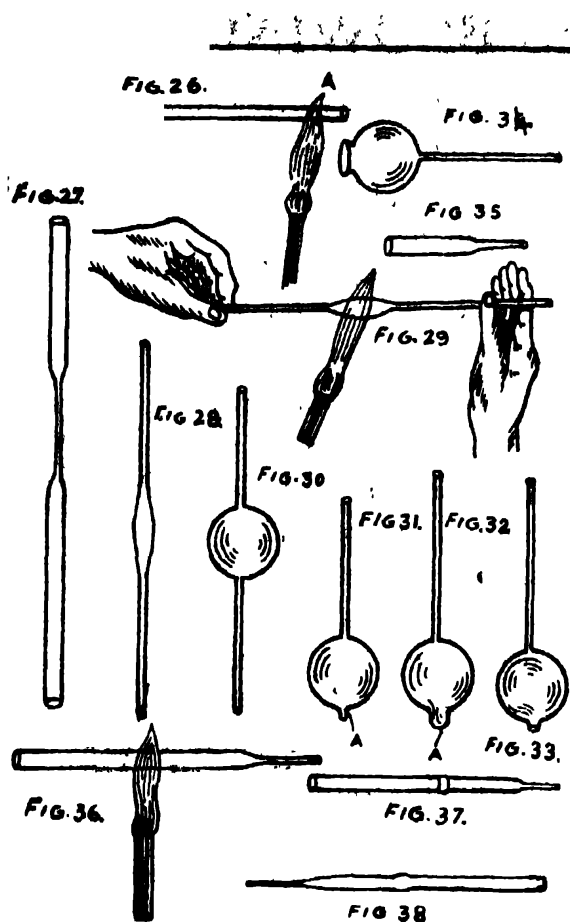
Now break one of the points of this tube, and hold it in a horizontal position so that the bulb A. (Fig. 29) is alone heated. In order to effect this result the flame should not be too high. Rotate the tube with right hand, supporting it with the left hand, and as soon as a bright red heat is attained, remove and blow a small bulb about $\frac{1}{4}$ in. diameter; reheat this bulb to the same temperature as before, again remove, and this time blow a large bulb about $1\frac{1}{2}$ in. diameter. The first bulb

may be blown with the tube inclined but the second one will be better blown in a horizontal position. The perfect bulb is shown in Fig. 30.

THISTLE FUNNELS.

The bulb obtained as above may now be converted into a thistle funnel by the following operation.

Heat the tube with the small flame at the point A. (Fig. 30) and draw away the capillary tube (Fig. 31) turn up the gas, and play upon the end of the bulb A until thoroughly heated. Now remove from the flame and gently blow out an elongation, Fig. 32; get the extreme end of this elongation red hot, then quickly blow so as to burst it; remove the fine glass. It will then look like Fig. 33. Now turn the flame of the blow-pipe full on, hold the tube in the flame so that the open mouth is thoroughly heated, and rotate the tube so as to distribute the heat evenly. The mouth of the tube will lose its sharp outline, the glass fusing and falling in to some extent. At this point take up the triangular tool in the right hand, remove the bulb from the flame, place the triangular tool within the mouth of it inclined at a slight angle, then spin the tube round between the thumb and fingers, bringing the mouth of the bulb against the edge of the copper tool gently until it is forced out equally all round, when the thistle-head will be complete. (Fig. 34). For good work, only the mouth of the tube must be very hot and it must be spun in the left hand. After placing the copper tool



in the bulb it must not be again moved. The tool should first be warmed and rubbed with a little beeswax.

JOINTING TUBES.

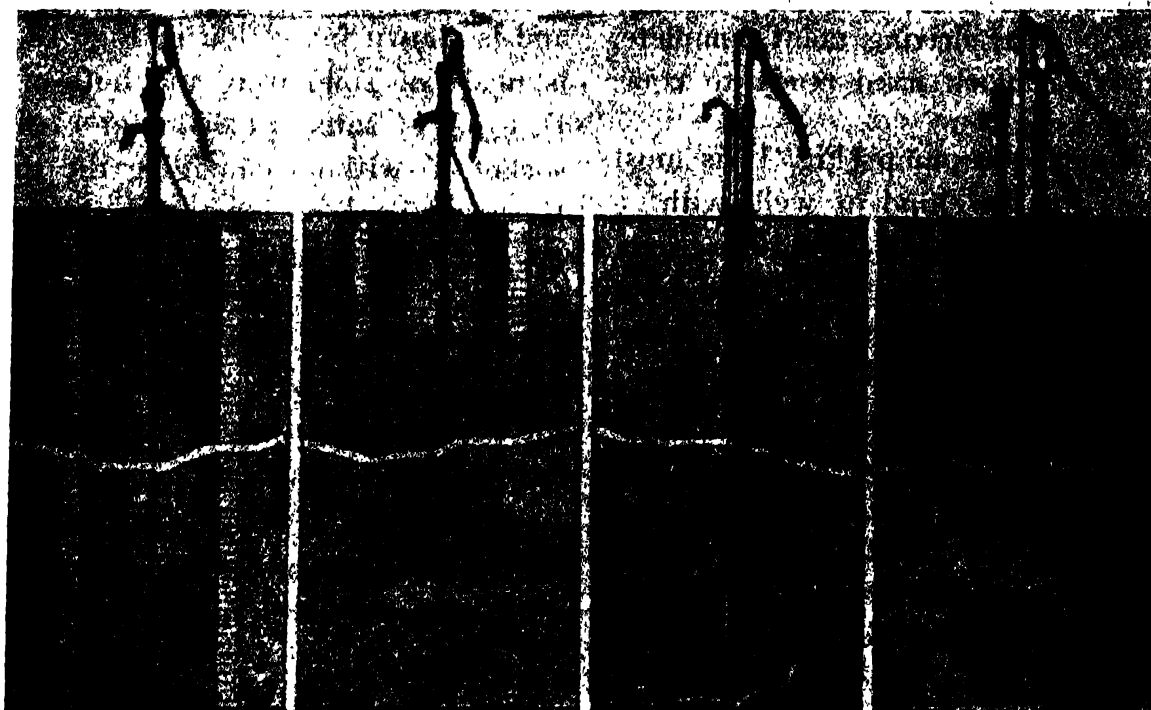
When it is necessary to join pieces of tubing together, they are jointed by fusion by the following process. Take a portion of tube $3\frac{1}{16}$ in. in diameter and cut a piece with one end at least perfectly true. Take another portion of the same tube about 5 in. long and also cut true at both ends. Hold this second portion in the large flame so that the central portion is heated, then quickly draw out to a capillary tube; hold the finer portion in the flame for a second and then draw the hands away, thus severing it forming two tubes like Fig.

35. Now take up the first portion of the second pieces in the left hand, hold each of them in the edge of the large flame, (Fig. 36) so that their mouths are alone heated, rotate, and before the glass falls in too much, bring them gently together while in the flame. This results in the tubes being cemented one to the other, the join, however, being thick and readily seen. Care must be taken in pressing the tubes together because a touch only is required. At the same time the join must not be too thick, nor too weak. (Fig. 37).

Continue heating the thickened part of the tube, supporting the fine tube with the left hand, and rotating with the right hand, then withdraw and blow a very tiny bulb right on the junction (Fig. 38); in this way the thickening is got rid of and the joint secured. Heat the bulb very slightly, remove again from the flame, then with a twisting motion withdraw the hands away from each other until the bulb disappears, being drawn until it becomes the same diameter as the tube. The joint, if properly made, will scarcely be distinguishable.

Whatever be your plans for your business, your visions of its possibilities, your ideas and ideals, you cannot see clearly into the future unless you have a clear picture of the past for comparison.

SINKING A TUBE-WELL.



The open or dug well The driven well

A properly constructed drilled or cased well

OF late tube-wells have come into vogue in many parts of India. This particular type of wells is adapted for obtaining water easily, both for agricultural and for household purposes. They can be sunk at a cheap cost in the villages to supply pure drinking water and also wherever there is scarcity of water.

Water obtained by means of tube-wells is free from all atmospheric influences, surface drainage, outside contamination etc., and thus its value in comparison with dug wells for the supply of water cannot be over-estimated. Another very important feature is that water from the tube-well is more even in temperature at all seasons. These tube-wells can be inserted to any depth into a water-bearing stratum without trouble, except into rock; but no great

depth can be got with a dug well after water is struck, unless a very expensive system of pumping be resorted to.

A tube-well can be driven to any depth provided the water rises to a height of not more than 20 ft. from the surface of the ground, and will be capable of raising 300 gallons of water per hour. The following materials are required to drive a tube-well: (1) one small iron pump, (2) 20 ft. of 1-in. iron steam-pipe, (3) one driving point. The essential parts of a tube-well are described and illustrated below.

Fig. 1 A complete tube-well and pump, with section of soil strata.

Fig. 2 The driving point showing.

(A) Steel Point.

(B) Strainer holes.

Fig 3 The pipe or tube with

(C) Socket.

Fig. 4 Enlarged section of pipe, showing (D), (E) Driving block.

Fig. 5 The driving point complete, with driving block fixed ready to commence sinking.

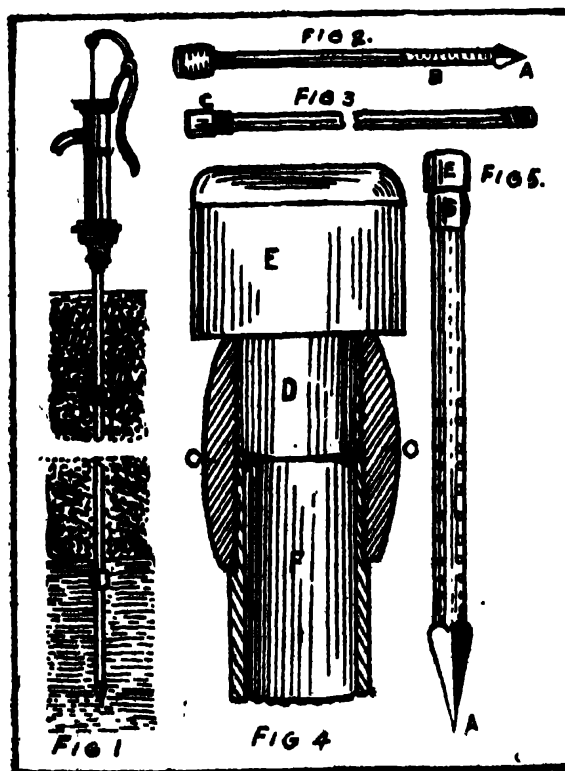
A small iron pump (Fig. 1) is most suitable for this kind of well, with a 1-in. suction-pipe, and will raise one-twelfth of a gallon at each stroke. Care must be taken when obtaining the pump that the suction-pipe is screwed to fit the 1-in. iron steam pipe.

The driving point is made from a piece of 1-in. steam-pipe, 3 ft. long with a screw thread at one end to fit the socket on the 1-in. pipe which forms the tube of the well. At the other end a four-sided iron point is welded on, shown in the figure at A, this is to form the piercing point to cut a way through the soil. Above the iron $\frac{1}{4}$ -in. holes are now drilled in the pipe, as shown at B; these holes are to form a strainer for the water at the bottom of the well. It is advisable to harden the point after drilling the holes to prevent it being burred while driving. The point can be welded on and the holes drilled by any blacksmith.

The tube for the well (Fig. 3) is the ordinary 1-in. iron steam-pipe, in lengths of 4 ft. to 6 ft. these lengths being much easier to handle than the usual lengths of 12 ft. (the internal diameter of the pipe is to be measured). At one end of each length of pipe will be furnished a socket with square ends; these ends should be rounded off with a file, as shown at C, so as to offer the least resistance while being driven down.

The driving-block is to prevent the end of the pipes being damaged while being driven with the sledge-hammer, and is shown in section in Fig. 4. This is made of solid iron, the bottom end, D, to be of sufficient diameter to fit the socket, C, without damaging the thread. It should be 1 in. long, and should bed on the top of the pipe, F, perfectly level. The upper part of the block, E, is to be 2 in. in diameter and $1\frac{1}{2}$ in. long; this part of the block takes the blow of the hammer in driving.

The spot where the well is to be sunk must be selected judiciously and the tube must be driven sufficiently deep so that water may not run short at any time of the year. Before commencing to drive the pipe, the lengths should be screwed together to test the threads; if this precaution is not taken



very often the edges of the threads are damaged, and great difficulty may be experienced in repairing them when driven in the ground.

Everything being found in good order, the well is commenced by making a hole with the aid of an iron bar about 1 ft. deep, great care being taken to make it upright, for on this the success of the well greatly depends. On withdrawing the iron bar, the driving point is placed in the hole, arranged as shown in Fig. 5—E. being the driving block, A. the point, and B. the holes in pipe to form the strainer—and driven down with steady blows of a heavy mallet or sledge hammer. When the point is driven nearly level with the ground, the driving block is removed, a length of pipe is screwed to the socket, G, and a little thick paint is smeared on the threads before screwing up to make a good water-tight joint. After driving this length, another is added until the whole length is driven into the ground: but the last should be left 1 ft. or 18 in. above the ground to form a standard for the pump. The whole of the pipe being driven, the pump is screwed to the last socket, a little paint being put on the threads before screwing up. The well is now complete, and water may be raised. At first the water will be rather dirty; this will however be exhausted after a few hours' pumping.

ARTIFICIAL MOTHER-OF-PEARL.

OWING to the increase in the cost of natural raw products recourse is being taken to an ever-growing extent to the provision of substitute materials, as far as science and technical skill can meet the demand. Although we are to-day convinced that all precious metals, such as gold and platinum, etc., can be reduced to common substances by breaking up their atoms, the question of producing artificial gold is still beyond discussion, because it would require enor-

mous amounts of energy. Progress with the production of artificial diamonds which consists of common carbon, would also seem to have come to a standstill, although microscopically small diamonds were produced even 20 years ago by Moissan. On the other hand, anybody who has invested capital in genuine pearls would do well to reconcile himself to the fact that before long artificial pearls will be put on the market which will be fully equal to genuine pearls at a much lower figure. Science is already fully acquainted with the chronic composition and physical action of the pearl matter, so that there are no serious difficulties in artificially reproducing the process carried out by nature. Mother-of-pearl, which consists of the same substance as real pearls, has already been most successfully imitated by artificial means. It has long been known that this substance consists chiefly of calcium carbonate and that the brilliance of pearls and mother-of-pearl is due to a so-called interferential phenomenon, produced by a fine skin over the fundamental substance which has a similar effect to petroleum when poured on to water. The light rays are partly thrown back by the upper layer of this skin and partly penetrate it and are then reflected by the fundamental substance. This means a difference in the action of the two light-waves which causes the lustre of the pearl. The French investigators, Clement and Riviere, have recently produced these processes by artificial means by saturating gelatine with a calcium salt and producing on this fundamental substance a skin of carbonic and nitrous sodium. This produces the actual appearance of genuine mother-of-pearl, so that it is impossible to detect the difference with the eye. The hardness of this artificial mother-of-pearl is certainly somewhat inferior to that of the genuine substance, so that the process may perhaps be improved in this direction, especially when it comes to its application to artificial pearls.

DYEING RECIPES.—I.*(By a Practical Expert.)***Dyeing Cotton.****RED.**

Dissolve 4½ lbs. cream of tartar and 4 lbs. alum in the requisite quantity of water. Soak the cloth in it and boil in slow heat. When cool wash in clean water. Dissolve 12 lbs. madder and ½ lb. chloride of tin in hot water and heat for half-an-hour. Strain through a piece of canvas. Dissolve the sediment in water and soak the cloth in the dye. Dry and finally wash in soap solution.

(2) RED.

Dissolve 1 oz. scarlet dye in 5 srs. water and soak the cloth in it for 15 mins. Then soak it in alum solution and subsequently in arrow-root solution. Take it, wring gently and spread out to dry avoiding shrinkage. To prepare arrow-root solution, take 1 poa arrow-root and dissolve in ½ sr. hot water. Bring to boil 4 srs. of water in a vessel and pour the arrow-root water in it. Remove when it has boiled for 15 mins. Strain when cool and soak the cloth in it.

(3) RED.

Dissolve 1 oz. carmine in 6 srs. of water and add 1 dr. ammonia. Soak the washed clothes in it for 1 hour. Rasp them thoroughly from time to time. Wring out and soak in arrow-root solution. Take out, allow to drip and spread out to dry. Fold it up without shrinkage.

(4) PINK.

Bring to boil 8 srs. water in an earthenware vessel. Dissolve in it 1 oz. magenta and after ½ hour 1 ch. alum powder. Remove when the liquid be-

comes half and when cool pour in vinegar. Soak the clothes in it for six hours. Wring out, wash in clean water and dry.

(5) LIGHT YELLOW.

Dissolve 1 oz. yellow magenta in 4 srs. water. Soak in it as many clothes as it can take up. After 15 mins. take out and wring out. Now add ½ poa vinegar in the solution and soak the clothes again, rasp well and dry.

(6) VIOLET.

Dissolve 2 oz. violet magenta in 6 srs. water and then add 1 dr. pearl ash. Soak the clothes well. After one hour wring out and dry in the air.

(7) RED.

Dissolve 1 oz. pearl ash in 1 gallon water. Boil the cloth to be dyed in this and dry in the air. Prepare an extract of gall nut and soak the cloth again in this. When dry soak the cloth again twice in alum solution. Prepare a decoction of madder and steep the cloth in the dye.

(8) SKY BLUE.

Powder finely 4 oz. copper sulphate and boil in 4 srs. water. Remove when only 3 srs. are left. Add ½ oz. prussiate of potash, steep the clothes when cold and rasp thoroughly. Wring out the water and keep in a dish. Dissolve in another vessel 1 dr. pearl ash in 3 srs. water and soak the clothes in this solution and dry.

Dyeing Silk.**(1) BUFF.**

Boil 1 oz. annatto in 30 oz. water and stir in 2 oz. potash. Soak the silk in this for 5 minutes. Take out and dry. Do not wring out.

(2) VIOLET.

Dissolve 2 oz. violet magenta in 6 srs. water. Then soak the washed silk in it for 15 mins. and take out after that period. Now dissolve in another vessel 2 dr. American pearl ash in 6 srs. water and steep the dyed silk in this. Finally dry.

(3) BLACK.

Break half a seer of gall nuts into pieces and soak them for 5 days in 5 srs. water in an iron pan. After that period boil on fire; when ebullition occurs and the colour begins to appear throw in 2 dr. ferrous sulphate. Remove when the decoction is reduced to half and strain when cool. Stir in 2 dr. pyrogallie acid and then soak the silk in it, rasp well and after 10 minutes' soaking wring out and dry. A fast black will thus be obtained.

Dyeing Wool.**(1) BROWN.**

Finely powder 1 sr. walnut shells and boil the same in 6 srs. water. Remove when the decoction is reduced to half. When cool, strain and mix 1 oz. vinegar. Now soak the wool in this for some time, wring gently and dry.

(2) GREEN.

First bray in a mortar and pestle $\frac{1}{2}$ oz. of Indian indigo with a little water. Dissolve the paste in 4 srs. of water and then soak the wool in it; rasp well, and wring out and set aside on a plate. Now take 1 poa good turmeric in another vessel and grind to a fine paste.

Dissolve this in 4 srs. water. Steep the dyed wool again in this for four hours. Take out, wring gently and dry.

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FOREST AND MINING RESOURCES OF THE CHHATARPUR STATE.

The State of Chhatarpur is one of the 7 major States of Bundelkhand and has a total area of about 1130 sq. miles.

The forests are sufficiently rich in their major and minor produce. Good quality *Tectona Grandis* (Teak)—a royal tree—is in abundance besides *Khair* (*Acacia Catechu*), *Mahu* (*Bassia Latifolia*), & *Dhawa* (*Anogeissus Latifolia*) which are also in no less number than the above.

Minor products of forest comprise various dyeing and tanning barks, leaves and fruits, bamboos, gums, wax, honey, horns, skins, bones, etc. Numerous valuable and useful herbs and species such as *Safed Moosli*, *Amaltas*, *Satawar*, *Nagar-motha*, *Indrajau* and *Lemon grass* are also found. Lac is propagated on *Dhak* (*Butea Frondosa*), *Ghont* and *Ber* trees. *Salaia* (*Boswellia Serrata*) being common in the forests, attempt is being made for collecting *Guggal* (Resin Gum) by tapping the trees. To sum up, there are possibilities for extraction of cutch and tannin, paper making from bamboo pulp, bidi and cabinet making and of manufacturing sugar from *Date Palm* trees.

Mining operations have recently been started in the State and the following minerals have so far been discovered:—

Iron ore, Red Oxide of Iron, Lime, Slate, Sand and Cut Stones, Felspar, Kaolin, Red and Yellow Ochre, Iron Pyrites, Rock Crystals, Quartz and Mica. There are also possibilities of Copper, Diamond and coal.

—A. P. K.

MATCH INDUSTRY IN INDIA.

NOW-A-DAYS match manufacturing companies are being started in India. Generally they are started in two ways. One by getting the splints and veneers from Calcutta with a small capital and managing to dip the splints in chemicals and pasting the boxes and packing them in dozen and gross and then putting them in the market.

The second way is by getting the chopping or peeling machine from Calcutta and then cutting the splints and boxes in their own factories and preparing matches.

In dealing with the former method it requires only small capital but there is practically no profit; the reason for which is that the companies which are supplying the splints and boxes are supplying the medium size boxes. Moreover the splints are not so nicely cut as the Japan or the foreign ones; and are rather stout on account of which the people are under the impression that the boxes contain only a few matches. Further they cannot be sold at more than Rs. 2 or Rs. 2-1 per gross and there is no scope for the retail dealers to sell them at more than Rs. 2-4 per gross by which they get a profit of only annas three or four which is rather very small when compared with the profits obtained by selling the foreign matches.

So the market is unfavourable for pushing on such an industry.

There are some companies at Calcutta which are also supplying unbleached large and small size boxes and splints, but they are not much favourable in the market as they are unbleached and do not make so good in appearance as the foreign ones.

If these splints are bleached in small match factories the profit thus obtained

will be hardly sufficient to cover the cost of bleaching and the labour utilised.

I do not wish it to be understood that match making in India can never thrive but on the other hand I am strongly convinced that properly organised this industry has a great future before it, so far as India is concerned.

In this connection the following suggestions given from my experience may be found useful:—

(1) Good and tested machines should be selected for this purpose.

(2) There should be large and regular out-turn of splints and veneers.

(3) The splints should be of the large size and should be *bleached*.

(4) Special attention should be paid to the neatness of the work in preparing the boxes; and attractive labels are recommended for the *Trade Mark*.

(5) Special care should be taken in painting the side with the side composition and see that it lasts at least so far as all the matches in the boxes are exhausted.

(6) The tips of the splints should be uniform and special care should be taken not to allow the tips to give sparks when ignited.

(7) It would be better to grind the chemicals properly.

(8) Pure chemicals should always be used.

(9) The dozen and gross packets should be strongly packed and neatly labelled so as to appear attractive.

(10) It is better to stock the matches for a period of three months before they are put in the market.

I feel much pleasure to give any information about this industry so far as my knowledge of it goes and in conclusion I appeal to all my brethren in India to give every possible encouragement to the growth of this industry in India.

BY MR. A. V. NATH.

INDIAN COFFEE INDUSTRY.**INTRODUCTION.**

WE all know what coffee is and it is one of the universal non-alcoholic drinks—tea, coffee and cocoa. These beverage drinks have become the fashion of the day and it has become a practice to use them either for luxury or as a foodstuff. Within the last 250 years coffee has come to prominence from obscurity as a favourite drink. As tea is to North and East India, coffee is to South India. It must be pointed out that unlike tea, coffee cultivation and trade is essentially a Cottage (domestic) Industry employing men, women and children and can be successfully taken up by small capitalists, for no elaborate machinery or huge factory buildings are required as the seeds of the berries of the coffee plant contribute to the beverage. Trying to know about its history, tradition traces back the industry to the 16th century and origin from Persia but systematic cultivation dates back only from 1830. India occupies the highest position at present as the producer of coffee in the British India although its plantation is principally restricted to the southern part of the Peninsula comprising Madras Presidency, Coorg and the States of Mysore, Travancore and Cochin. Botanically classified, coffee plant is of eighty species but only one variety, *Coffea Arabica* is grown in India.

CULTIVATION.

Industries connected directly or indirectly with agriculture will probably have first claim on financial investment and bring in prosperity. We must

follow the example of the planters of America. Coffee plant is a hardy shrub thriving best at temperatures ranging from 60 to 95 deg. Fahr. and many points are to be observed when it is cultivated for commercial purposes. Long spells of dry weather militate against the crop and strong continuous winds are inimical to the plant, therefore local features are to be studied when selecting the site. As good drainage is absolutely necessary for the healthy growth of the plants, undulating land is better for their cultivation. Hillsides not liable to be washed away in heavy rains, especially the foot hills, of shrub-covered volcanic range suit coffee. Though it succeeds best at distances of 1 mile to say 20 miles of the sea, yet our experimental gardens at Joypur (Vizag) and Anantapur 800 ft. above sea level and 300 and 500 miles from the sea have given us good encouraging results. Where natural drainage is not good it must be made so artificially.

The next consideration is how to obtain the plants. Either plants may be purchased or the seed procured, and then a nursery bed is made. A slightly sloping ground is selected for the bed, well dug up for a depth of one foot, the earth is made loose and freed from roots, stones etc., if such there be. A temporary partial shade is erected above and the seeds are dibbled to the depth of 1 inch, about 3 inches apart in straight, parallel rows 3 inches from one another. The germination of the seed will take from four to six weeks depending upon the weather, during which period the bed must be kept moist.

When the young plants are about 2 months old they attain a height of about 9 to 10 inches and they are ready for the field. The distance apart of the plants in the field varies a little according to the soil and if the latter is moderately fertile they are spaced 7 feet by 7 feet apart and in rich soil 8 feet by 8 feet apart. Holes to receive the plant are made a cubit (18 ins.) in length on all sides and the bottoms are broken up with a spade bar before filling in the soil. The excavations are filled in, first with the top earth, spreading the soil from the bottom of the hole.

The operation of planting is the most important work in the establishment of a coffee garden. Great care should be taken in removing the plants from the seed bed so as not to break the tap-root. This is being done by digging a trench in front of the first row of seedlings to a depth of 9 or 10 inches. The spade is inserted vertically between the first row and the one next behind it. The handle of the spade is pulled to cause the plants to lean somewhat forward. If the spade be released likewise to the end of the line and if the spade is carefully passed under the plants at the bottom of the trench pressing the plants forward with right hand on to the spade, they are lifted with ease and the least risk of damage. As much soil as possible is kept about the roots when removing and the plants transported to the field under shade.

The plants are transplanted without cramping its roots, particularly the tap-root is kept perfectly straight and filled about the laterals. Holding the plant

firmly, water is poured round the plant, enough to settle the soil among the roots. Attention is paid not to allow the plant to sink lower (as is the tendency under watering) than a couple of inches below the general surface of the surrounding ground. It is necessary to shade the plants from the mid-day sun until they take hold. When the plants attain a height of about 12 inches they must be staked to prevent their being blown over.

Pruning is done when the trees have grown to 4 feet 6 inches or 5 feet in height, i.e., they are topped or headed in. There are many opinions as to how and when to do it. But this topping is done to strengthen the lower limbs and fill in the tree. The first and perhaps the most important step in pruning is to open the centre of the tree, by removing all the branches from the primaries growing within 6 or 7 inches of the stem. This enables the penetration of sun light and free circulation of air. After pruning a number of shoots spring up but these are again plucked out. The whole operation throws the energy of the tree into the development of its lower parts promoting the spread of branches, thus shading the ground and producing the crop where it can be easily gathered. The foregoing directions for pruning will be sufficient for general purposes.

Nearing the 4th year, surface roots begin to occupy the ground and these should not be injured. Coffee plant flowers from the beginning of October to the first week of December. In good growing weather it may commence

early, but if the season is dry flowers may not show till the middle of December but this does not often occur. Coffee makes the best of a small amount of moisture.

HARVEST AND YIELD.

The berries begin to ripen in May or June and in some localities earlier and hand-picking is finished by middle of September or continues up to December in droughty conditions. The early ripening is always small, is off in a fortnight and before the pickers go into the field again there is a spell of two to three weeks. The second picking will bring in three quarters of the crop. When the berries assume a bright red or purple tint it is to be known that they are ready for picking. Picking may be commenced soon, the beans in the berry will move one upon another when pressed firmly between the thumb and the finger. There are two varieties, viz., cherry and pea berry, the former contains two seeds and the latter contains simply one seed. The yield per tree will be 50 to 80 lbs. and after curing the average is taken at 40 lbs. After ten years it is better to remove the crop and start fresh cultivation.

CURING.

After all the berries are collected the next operation is pulping or removing the skin or covering. There are many methods for the purpose. The berries are dried and pounded or wetted and pulped, or removed by means of a machine of simple construction called a pulper. The first two processes are easy of comprehension: hence require no elaborate explanation. Pulpers are of

various contrivances; a fairly effective method for small quantities, is to pass the cherry between two wooden rollers geared together near enough to squeeze out the beans without crushing them. Under the rollers lies a small tub or semi-barrel piece filled with water and over which a sieve of half-inch mesh is placed and supported on a couple of lathes and resting on the edge of tub or barrel. The separation of the beans from the skins or pulp is helped if water is fed with the cherry. The sieve requires frequent shaking. The beans will descend to the bottom by gravitation and the floating pulp is thrown away. This method will do if the coffee field never exceeds 2 acres in area. For good clean work pulping should be done on the day of picking or next day at latest. Large planters adopt the disc and the breast pulpers. Water must also be freely used with the berries in pulping to facilitate an easy separation of the beans from the pulp.

PROCESS.

Between the outer red skin and the inner parchment is a quantity of viscid matter which must be got rid of or the coffee would not dry properly and also become mouldy and spoiled for sale. So they must pass through a fermenting process, by placing the beans fresh from the pulper in a receptacle or vat and keeping for about 24 hours. The period may vary with temperature. Acetous fermentation turns the viscid matter into a fluid like vinegar easily washed away from the coffee. After washing, the seeds are placed in trays 3 ft. square and sides of 3 inches wide with bottoms

of small mesh woven galvanized wire or perforated zinc made to stand on stakes 3 feet high. It is better and cheaper if the seeds are spread to less than 1 inch depth on cemented floors. To ascertain whether the coffee is dry enough, a bean or two are examined by pressure of the thumb, nail or between the front teeth; if either make an indentation it is not quite ready for housing. It usually takes six or seven consecutive days of sunshine to dry the beans thoroughly which must be twined frequently say thrice daily.

The next and final stage in the preparation of the beans for the market is hulling, i.e., removal of the parchment and silver skins. The latter is a fine tissue lying between the parchment and the bean. There are several ways but the simplest and easiest is to bruise it off under a gunny. Much pressure and friction are exerted and the chaff blown away. Last of all the beans are graded into sizes and recognised as A, B, C; pea berry is separated from the flats and the broken or imperfect beans are classed as triage. After being bagged the beans are ready for market.

POWDER.

Preparation of coffee powder from beans is in itself a paying industry and can be even taken up as a separate business by parada ladies.* The beans are roasted with a little ghee on a moderate oven until they turn black and are removed from the fire. After roasting while still hot, sprinkle over them pulverized sugar, stir up well, sprinkle on some more. The coffee looks as if coated with varnish and even if kept for a long

time, suffers no loss of aroma. They are pounded in an ordinary pestle and mortar or powdered in the coffee grinders. These are of three sizes, the biggest costs only Rs. 10|- and the vessel or mouth receiving seeds holds a lb of seeds and can be easily fitted to the edge of a table or bench. As the handle attached to it is turned powder drops down and is collected in a receptacle.

CONCLUSION.

Naturally, there will be difference in details in different localities—meteorological conditions, differences in quality of soil, situation of plantation, etc. But the general principles of cultivation and preparation of the beans, are the same pretty well all over our country. The quotations of coffee are given in Rupees per 26½ lbs in India and in shillings per cwt. in London. The Indian coffee is mostly prepared for export and the annual exports from India is 230,000 cwts. United kingdom and France are the best purchasers of Indian coffee. Every thing is written that has been intended for the small grower and even a small farmer can easily add 2 or 3 acres of coffee to his cultivation or all those who can get waste (bunger) or khas land on small rent or tax can start in the line as this will give enormous profit to the organizer and what is more creates work for the women and children folk. Any one wishing to go into coffee-growing may communicate for full details and estimates to the writer from whom the reader will get free information.

—BY MR. E. LAKKARAJU NAIDU, ..
"Chemo-House"

Kharida Bazar Road, Kharagpur.

ACTION OF ACIDS ON WOOL.

DILUTE solutions of hydrochloric and sulphuric acids have little influence on wool, whether applied hot or cold, further than opening out the scales and making the fibre feel somewhat rougher. It is important to remember, however, that the wool attracts or absorbs a considerable proportion of the acid presented to it, which it is extremely difficult to remove by washing or even boiling with water. Wool boiled with dilute acid and afterwards with water may be dyed with acid coaltar colours without the usual addition of acid. When treated with too concentrated acids, the fibre is soon disintegrated but in any case their destructive action is by no means so energetic on wool as on cotton. This fact is made use of to separate cotton from wool in the process of "extracting" or "carbonising" rags containing both fibres. The rags are steeped in dilute sulphuric acid, and after removing the excess of liquid, are dried in a stove at about 110 deg. C. The disorganised cotton can then be beaten out as dust, while the wool remains comparatively little injured. Another method is to submit the rags for a few hours to heated hydrochloric acid gas.

By heating wool with concentrated hydrochloric acid, it gradually becomes almost entirely dissolved, the solution containing so-called "lanuginic acid" a substance which is said by some to play an essential part in certain cases of dyeing.

Nitric Acid acts like the acids just mentioned but it also gives a yellow

colour to the wool. Because of the comparatively light yellowish colour it thus imparts as well as its destructive action upon dyed colours, boiling dilute nitric acid is frequently used as a "stripping" agent for wool, i.e., to destroy the colour in wool already dyed, for the purpose of re-dyeing (job-dyeing, rectifying mistakes, etc.) Care must always be taken not to have the acid too strong, and not to prolong the process beyond three or four minutes.

Sulphur dioxide (sulphurous acid gas) removes the natural yellow tint of ordinary wool, and is the most usual bleaching agent employed for this fibre. The gas is very persistently retained by the fibre, and should always be removed by the fibre, and should always be removed from bleached wool previous to dyeing light colours. This is effected by steeping the wool in very dilute solutions of carbonate of soda, bleaching-powder, or hydrogen peroxide, and washing well. When the first reagent is employed, the acid is merely neutralised, but with the two latter the sulphurous acid is oxidised to sulphuric acid. Should this precaution be neglected, the wool will not dye properly, or, when dyed, it may be liable to become decolorised again through the reducing action of the sulphur dioxide retained by the fibre.

BY MR. DINA NATH DOSAJI.

One weakens everything that one exaggerates.

A man hath power over his words till they are spoken but after they are uttered, they have power over him.

SMALL TRADES AND RECIPES.

Artificial Fruit.

Sow at the proper season of the year the stalks of some kind of fruit, with the stones to them; take neat tins very smooth inside, and the shape of the fruit wanted, leave a hole to put in the stone and stalk, and so contrived as to open in the middle to take out the fruit; there must be also a wooden frame to fix them in. Take very strong jelly, strain it, put it into a saucepan, and sweeten, add lemon peel perfumed, and colour it according to the imitated fruit. Stir all together, give it a boil, fill the tins and put in stones and stalks just as the fruit grows; when quite cold, open the tins, and put on the bloom, which must be done by carefully dusting on powder blue. Ingenuity will greatly improve on these artificial fruits, but much nicety and continual practice only can perfect it.

Gooseberry Jam.

Cut, and pick out the seeds of fine, full-grown gooseberries, but not ripe. Put them into a pan of water, green and put them into a sieve to drain. Beat them in a marble mortar, with their weight in sugar. Boil a quart of them to a mash in quart of water; squeeze, and to every pint of liquor put a pound of fine loaf sugar. Then boil and skim it, put in your green gooseberries, and having boiled them till very thick, clear, and of a nice green, put them into glasses.

Candied Ginger.

Grate an ounce of ginger, and put it with a pound of loaf sugar beaten fine, into a tossing pan with water to dissolve it. Stir well together over a slow fire till the sugar begins to boil, stir in another pound of sugar beaten fine, and continue stirring it till it is thick. Then take it off the fire, drop it into cakes, upon earthen dishes, set them in a warm place to dry; they will be brittle, and look white.

Gooseberry Paste.

Take full grown red gooseberries, cut them in halves, and take out the seeds. Have ready a pint of currant juice, and boil your gooseberries in it till tender. Put a pound and a half of double refined sugar into your pan with water to dissolve it, and boil it to a sugar again. Then put all together, and make it scalding hot, but not to boil. Pour it into plates and dry in an oven.

Green Colour for Candies.

Digest $7\frac{1}{2}$ grains of saffron for 24 hours in $\frac{1}{2}$ ounce of distilled water. Dissolve, on the other hand $3\frac{1}{2}$ grains of indigo carmine in $\frac{1}{2}$ ounce of distilled water. An intensely green colour will develop on mixing the two solutions. By boiling the colouring matter, compounded with sugar to syrup it can be kept for months or it may be evaporated to dryness in a porcelain or glass vessel.

INDIA'S INDUSTRIAL PROGRESS.

Industrial Progress in Bengal.

The report of the Director of Industries, Bengal, for 1924 discloses a record of useful work done by the department during the year in all branches of its activity.

The research work conducted at the Calcutta Research Tannery was of special interest and comprised a variety of subjects including tannage of sole leather, manufacture of box sides from dry-salted cow hides and the tannage of lizard skins.

The investigation conducted with dry-salted hides from the districts of Rangpur and Dinajpur brought to light the interesting fact that although these hides were otherwise of excellent quality their value was seriously impaired by the presence of pox marks which was almost universal. The Director of Industries lays stress on the urgency of freeing the cattle of the province from pox as the prevalence of this disease, besides being highly detrimental to the agricultural industry, seriously impairs the economic value of the hides of the cattle.

A process was worked out during the year for tanning lizard skins and steps were taken to introduce it among the local tanners.

India's New Seaport.

Work of construction of the new seaport of Vizagapatam on the Bay of Bengal will soon begin. The project involves the dredging of the entrance of the harbour to 30 feet at low water, the construction of three deep-water berths with transit sheds, railway sidings, elec-

tric cranes, an oil depot, and the reclamation of some 350 acres of the back-water which will form the site for commercial premises, storehouses, workshops, etc., in close proximity to the harbour. A new railroad some 300 miles in length, connecting up Vizagapatam with Raipur in Central India, will also be built by the Bengal Nagpur Railway by means of funds provided by the Government of India. It is expected that, from the time the funds are voted by the Government of India, five years will be required to complete the reconstruction of the harbour.

Sugar from Palmyra.

A report has just been published by the chemist who was deputed by the Hyderabad State to observe and study the methods in vogue for the manufacture of sugar from the juice of the palmyrah and date palms in Bengal, Bombay and Madras Presidencies, comprising the results of his observation and experiments. He declares that, while sugar-cane must and will always remain the chief source for increasing the output of sugar in India, the date palm and the palmyrah palm can contribute not a little towards achieving that object. Out of the three million tons of raw sugar that is produced in this country annually, nearly 10 per cent. comes from palms. The species of date palm found in Bengal give more juice than the species most common to Bombay and Hyderabad. He is, therefore, of opinion that a propagation of the Bengal species is desirable to obtain a higher yield of juice.

SCIENTIFIC AND INDUSTRIAL TOPICS.

Uses of Vegetable Oils.

Peanut oil is becoming the most valuable food product of all oils. Almost half the oil made in France from imported products is made from peanuts. France has not yet learnt to use peanut butter. About three-fourths of the oil from shelled nuts can be made edible. Besides playing an important part in food products it is found that peanut and coconut oils are being used in all countries in soap making. Walnut oil is coming into use in food products; and olive oil, which long stood in a class by itself, is apt to surrender first place to some of the newer products.

Stains on Chrome Leather.

It sometimes happens that after neutralisation there appear, on the grain side of skins, bluish-green coloured stains. These are found particularly in the neck, loose and weak parts of the skin, and less frequently in the best portions. These stains may appear on both full and semi-chrome leathers. Before neutralisation there is no trace of any stain or discoloration, and the skin is of an even colour. It is also noticed that in the regions of these stains the grain presents a drawn appearance. These stains are not such a serious defect in the case of black leathers, but in the case of coloured work it is essential that they should be avoided, as they lead to uneven and

patchy dyeing. Even in the case of black leathers the stains cannot always be completely covered up.

It will be apparent that since the skins showed no signs of stains before neutralisation that it is the neutralisation, or the lack of treatment between tanning and neutralising, which has produced these stains. To avoid these defects, after the skins have been sufficiently chromed they should be taken out of the liquor and horsed off, grain to grain, and left in that condition not more than five or six days. This treatment allows the fixation of the chrome salts by the hide fibres, and thus increases the amount of chromium fixed by the skin. After this, the skins should not be neutralised immediately, but should be given a good washing in warm running water at 45 deg. to 50 deg. C. This washing should be of half an hour's duration at least, and has for its object the removal of the excess of chrome liquor left in the skins. The wash water should be run off, and the drum filled up with the neutralising liquor.

The choice of the neutralising agent is varied, but probably bicarbonate is as good as any.

Music as Medicine.

A medical journal has recently announced the results of some experiments

made to ascertain the relation of music and medicine.

One curious piece of news is that if a lively air is played on a harp mandolin, a man's tired muscles regain their original vigour. The music of a violoncello, on the other hand, has a precisely opposite effect, in temporarily lessening the usual strength and vitality of the hearer.

In nervous and impressionable people, sad music in a minor key, actually weakens the pulse and makes the beating of the heart feebler and more irregular.

An American doctor stated not long ago that almost every mental trouble could be cured by suitable selections of classical music regularly administered. Jealousy, grief, overwork, homicidal mania, nervous breakdown, all had their corresponding air.

Houses Built of Glass.

Plans for building houses of glass are being considered by American glass experts. Opaque glass can be produced in great quantities, it is claimed, at a reasonable cost.

The glass house, has been the butt of many jokes, when not actually used as a target for brickbats. It has carried with it, too, the idea that everything within its walls was open to public inspection, and that the occupants must go to bed with their clothes on to avoid embarrassment.

The material for the proposed glass house can be made in slabs one-eighth of an inch thick, thirty inches wide, and nine feet long. These slabs of opaque

glass can be made in any shade colour the builder wants.

houses must be constructed on a concrete foundation and a wood framework. There will be an air-pocket between the outside and the inside walls which will keep out both heat and cold. It is claimed that the first cost of the house would also prove to be practically the last as the need for repairs would be almost non-existent.

The Lightning Conductor.

Few people have a clear idea of the principles governing the use of lightning conductors. An ordinary piece of wire used as a conductor would be less useful in a severe thunderstorm than a single waterpipe on a house would be in coping with a waterspout. Nearly all lightning strokes are characterized by numerous side flashes, and these have to be provided for.

All the metal work on a building is inter-connected. The lightning conductor on the turret is joined perhaps to the rain-water pipes, these in turn link up with the iron railings round the building and so on. In this way the flashes thrown off by lightning strokes are collected and guided safely, to earth.

Many people imagine that the end of a conductor is simply buried a few feet in the ground and left to take soil would soon be burnt up, leaving the conductor almost useless. In ground that is permanently moist large copper plates are buried and the connections made to these. In dry soil, a tube filled with charcoal is used.

FORMULAS, PROCESSES & ANSWERS.

Settling Change in Soap.

1067. E. C. W. Alleppey.—Asks how can we meet the difficulties in settling soap.

The character of treatment on the settling change determines the success of the boiling. Deficiencies on previous changes may be corrected on a succeeding change, or by repeating the change, with but little trouble, but with the settling change any deficiency allowed to pass until it is recognised only when the soap is crutched means not only the loss of time involved in cooling but the trouble and expense involved in heating to the boiling point a kettle of cooled soap and of removing the excess of water by graining.

After withdrawing the strength lye, the open soap is boiled up with the addition of water until it is closed. Free alkali may be present in such amount that with prolonged boiling the soap refuses to close, in which event steam should be turned off, the soap allowed to settle for an hour or so, and the strong lye withdrawn, after which boiling is continued with the addition of water until the soap closes. Additions of water should be made now very carefully and only after each addition is well boiled through and its effect noted. The degree of hydration on the settling change is determined by the quality of stock used and the quality of soap de-

sired to be made. With soft-bodied stock, as grease or cotton-seed oil, or tallow stock heavily rosined, or firm stock, as tallow and coconut oil, the soap of which is to be unfilled, as castile soap, milled soap base, and floating soap, the settling should be coarse, with but a comparatively slight degree of hydration. Soap to be filled with soda-ash solution, of recognised hardening effect, as tallow stock lightly rosined, may be settled finer or thinner, i.e., more heavily hydrated than the various kinds of soap just mentioned. With the conditions of settling reversed, the nigre will be large and the yield of good soap small.

Blue and Grey Mottled Soaps.

942. H. N. D. Belgatchia.—Writes, "Please furnish me a formula for Blue and Grey Mottled Soap."

For preparing blue and grey mottled soaps two soap-pans are required. In one pan a *filled* soap is prepared from tallow and palm-kernel oil or coconut oil, which is afterwards removed to the second pan, and for every 1000 lbs. of soap are added 250 lbs. of silicate of soda solution, the whole being thoroughly incorporated by boiling until the soap-boiler judges that the proper condition of mottling has been reached. The colouring matter—ultramarine, for blue mottle—worked up into a thinnish

paste with water, is then sprinkled over the surface of the boiling soap a little at a time until the full quantity has been introduced; the proportion of ultramarine portion of soap is from 5 to 10 lbs. If the soap be in too liquid a state the colouring matter is apt to permeate the entire mass, giving it a blue tint throughout, and the desired mottled appearance will not be attained. When properly conducted the blue pigment shows in the soap in blue patches, which appear in strong contrast to the white ground of the soap, giving it a pleasing appearance to the eye. The grey mottled soap of the same class is coloured with finely powdered oxide of manganese, from 1 to 3 lbs to the ton, introduced in the same way as above.

A red mottled soap is produced with vermilion.

To Make a Duplicator.

945. M. C., Calcutta—Writes, "Please throw some hints on the preparation of hectograph."

The hectograph or duplicator is essentially a mixture of glue (gelatin) and glycerine. This mixture has the property of remaining soft yet firm for a long time and of absorbing and holding certain colouring matters in such a way as to give them up slowly or in layers, so to speak, on pressure.

This appliance may be made by melting together 1 part of glue, 2 parts of water and 4 parts of glycerine (all by weight, of course) evaporating some of the water and tempering the mixture with more glue or glycerine if the season or climate requires. The mass

when of proper consistency, which can be ascertained by cooling a small portion, is poured into a shallow pan and allowed to set. Clean glue must be used or the mixture strained; and air bubbles should be removed by skimming the surface with a piece of card-board or similar appliance.

Fountain Pen Ink.

997. M. S. M., Nyaunglebin.

Wants a recipe for fountain pen ink.

Logwood Extract	3 oz.
Ferrous Sulphate	6 oz.
Gum Acacia	3 oz.
Water	80 oz.
Potassium bichromate	4 drs.
Nigrosine	1 oz.

Boil together the first four ingredients until dissolved; while hot add the other articles. Strain through muslin.

Lithographic Inks.

946. K. S. N., Madras.—Wants recipes for lithographic inks.

BLACK.

	By parts.
Venice turpentine	1
Lampblack	2
Hard tallow soap	6
Mastic, in tears	8
Shellac	12
Wax	16

Melt, stir and pour it out on a slab.

RED BROWN.

	By parts.
Mutton Tallow	4
Card Soap	4
Yellow Wax	4
Orange Shellac	3
Mastic Resin	2

The following compound will furnish the colouring matter of the above. Take sufficient quantity:—

Prussian brown, ... 15 parts.
Vermilion, ... 1 „
Lampblack, ... 1½ „

Take all parts by weight. Melt together the tallow, soap and wax. While almost hot enough to ignite, gradually work in the mastic resin in fine powder. When this has all incorporated, add the shellac and when the mixture becomes homogeneous, then add the colouring matter and cut up into cakes. When it has set hard enough for use rub the ink in water.

White Discharging.

839. S. G. T., Berar.—Requests us to throw some hints on discharging.

Discharging is effected either by oxidising the dyestuff or by reducing it but the latter method is preferable. The most satisfactory reducing agent at present known to dyers is hydrosulphite of soda, and this can be incorporated in a paste, and used for discharge stencilling. It is, however, as a rule more satisfactory to use the more expensive, but more permanent hydrosulphite compound as acting only when heated.

The reducing stencil paste can be easily made by mixing with some "gum dragon" or flour paste, as much as it will hold of a saturated solution of the "stencil salt". It is judicious to experiment with the different dyes and classes of dyes before attempting a serious piece of work. But in general all the salt colours and the acid colours will discharge readily with this paste, and

remain colourless. The vat colours and the sulphur colours can also be reduced to colourless compounds, but it is not always easy to wash them out of the cloth after the reduction, and, if they remain in it, they are apt to regain their colour, on standing in the air.

The dyed cloth, carefully washed and pressed and dampened, is stencilled with the above paste and allowed to dry. When dry it is steamed and it will be noticed that when a certain temperature is reached the colour will be discharged. As soon as possible afterwards the cloth is to be washed in a hot soap bath to remove the reduced colour compound and to get rid of the paste. Then the cloth is dried and finished.

When trying this process with the vat dyes it is best to soak the cloth directly after steaming and before soaping, in a warm bath containing a little free caustic soda because the reduced colours of this class are not, as a rule, soluble in water, and are apt to oxidise again in a soap bath.

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316, Abdulrehman Street, BOMBAY.

Colouring Hair Oils.

977. R. G. D. Bros., Hyderabad.—Enquire how hair oils are coloured.

Hair oils may be coloured by the following methods. A red tinge is given to them by allowing the oil to stand for a few hours over a little alkanet root (2 dr. to the pint), before scenting it. The application of a gentle heat facilitates the process. Yellow and orange are given by a little annatto or palm oil, and green, by steeping a little green parsley or lavender in them for a few days; or by dissolving 2 or 3 dr. of gum guaiacum in each pint by the aid of heat, and, when cold, decanting the clear portion.

Vegetable Margarine.

1034. T. K. S., Petlad.—Asks, "Can you give me suggestions for making vegetable ghee?"

A good vegetable margarine may be made from 85 per cent coconut oil and 15 per cent liquid oil; or from 30 per cent palm kernel oil with 60 per cent coconut oil and 10 per cent liquid oil. Sometimes a hard fat such as stearine is incorporated as for example in the following composition:—

	per cent.
Oleostearine	15
Coconut Oil	45
Palm-kernel Oil	20
Arachis Oil	20

100

Melting-point 24.5 deg. C.

Vegetable ghee may be prepared on similar lines.

Gold Size.

1168. L. G., Gadag.—Requires a formula of gold size.

Boil 2½ gallons of linseed oil for 2 hours, then add gradually 1½ lbs. each of litharge and minium and 9½ lbs. of sulphate of iron, keeping the oil boiling all the time and stirring from bottom of the pot. It is advisable to have a large iron ladle ready to cool the mass down, if it should appear to rise too high, by ladling a part of it into an empty pot. After boiling the oil for about 3 hours melt 2½ lbs of gum anise and heat ½ gallon of raw linseed oil. When the gum is melted pour in the oil, let it boil until clear, then cool for a few minutes and add it to the first oil. Wash out the pot in which the gum has been melted and melt 2½ lbs. more of gum anise and heat ½ gallon more of oil in the same manner as before and add that also to first oil. Now urge the fire in the furnace, but keep it well in front, so that it can be drawn at a moment's warning. The gold size will soon throw up a frothy scum on the surface, which must be constantly kept

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down by stirring with the ladle, and never be allowed to rise higher than 4 inches below the edge of the pot. After boiling for about 5 hours it will commence to become stringy, but boiling must be continued until it hangs to the ladle and drops in lumps. Now take the size from the fire and cool it as quickly as possible, and when cool enough mix it with 8 gallons of turpentine, but do not stir until all the turpentine is in and the froth on the surface has disappeared, and then strain as quickly as possible.

Galvanising Iron.

375 B. D. S. R., Madras—Enquires how to galvanise iron.

Sheet iron, iron castings, and various other objects in iron are cleaned and scoured by immersion in a bath of water, acidulated with sulphuric acid, heated in a leaden vessel, just to remove the oxide. They are then thrown into cold water, and taken out one at a time to be scoured with sand and water with a piece of cork, or more usually with a piece of the husk of the coconut, the ends of the fibres of which serve as a brush, and the plates are afterwards thrown into cold water.

Pure zinc covered with a thick layer of sal-ammoniac is then melted in a bath, and the iron, if in sheets, is dipped several sheets at a time in a cradle or grating. The sheets are slowly raised to allow the superfluous zinc to drain off, and are thrown whilst hot into cold water, on removal from which they only require to be wiped dry.

Thick pieces are heated, before immersion, in a reverberatory furnace to avoid cooling the zinc. Chains are similarly treated, and on removal from the zinc require to be shaken until cold to avoid the links being soldered together. Nails and small articles are dipped in muriatic acid, and dried in a reverberatory furnace, and then thrown altogether in the zinc, covered with the sal-ammoniac, left for one minute, and taken out slowly with an iron skimmer; they come out in a mass soldered together, and for their separation are afterwards placed in a crucible and surrounded with charcoal-powder, then heated to redness and shaken almost until cold for their separation. Wire is reeled through the zinc, into which it is compelled to dip by a fork or other contrivance. It will be understood that the zinc is melted with a thick coat of sal-ammoniac to prevent the loss of zinc by oxidation.

Brewer's Yeast.

459 R. S. T. D., Chingleput—Wants to know the process of preparing brewer's yeast.

Brewer's yeast is a by-product in brewing beer and the preparation of whiskey. To prepare a small quantity, place 2½ lb. of malt in a pan with 1 gal. of water and allow to steep for two or three hours, then raise the temperature of the liquid to 170 degree F. After about half an hour's heating strain the liquid through a fine sieve into a bowl of water. Allow the liquid to cool to 70 degree F., take a teacup-full of brewer's yeast or about ½ oz. of dry

yeast, mix it with about a quart of the cooled liquid, and pour the mixture into the remainder of the liquid in the bowl. Stir well, then cover the bowl with a cloth and allow to ferment for from thirty-six to forty-eight hours. Now skim off the yeast, place it in a fine hard sieve, and wash once or twice with water; this will be in the condition of brewer's yeast. The dry yeast is a distillery yeast dried by centrifugal means or by pressure. Brewer's yeast is not satisfactory when pressed as it does not keep well.

Cleaning Jewellery.

243 P. K. R., Gauhati--Asks how to clean jewellery.

For cleaning gold chains and other articles of gold and silver having no stones (except pearls) may well be washed in strong soda water and soap, being afterwards rinsed in plenty of cold water and dried in sawdust in a warm place. Rings or other articles bearing stones (except pearls) may also be served in the same way, and the settings may be well cleaned out by fine-cut wood pegs and pieces of thread passed through the small openings. When polishing, use a soft watch-brush charged with a little dry rouge for the engraved or chased parts and rouge and water on the bare fingers for the plain parts. A wash after this is necessary to remove the rouge from the surfaces. Rings, etc., having half pearls set in sinks must not be made wet all over, for if water gets behind the pearls they will be discoloured. Whole or

half pearls set open in claws may be washed in cold water. In some cases prepared chalk is used for cleaning instead of soda water. A little is sprinkled on a soft watch-brush and the articles brushed over.

Soap Powder.

159 D. B. R., Madura--Wants good recipes of soap powder.

(1)

Soda ash, 58 per cent.	42 lbs.
Silica	220 "
Settled Soap	25 "
Salt	10 "

The ingredients are mixed in a specially adapted mixer for heavy material until dry and then run directly to the crusher and pulveriser, after which it is automatically packed, sealed and boxed.

(2)

Soap	85 lbs.
Filler	40 "
Salsoda solution 20 deg. B.	17 "

The dried soap chips are mixed with the filler and alkali and then pulverized,

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BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

1085 S. C. S., Jalpaiguri.—Refer your query to the Secretary, Students' Advisory Committee, College Square, Calcutta. For technical training you may write to Bengal Technical Institute, Jadavpore, Dhakuria 24-Perganas. Technical books may be bought of Chackerburttty, Chatterjee & Co, 15, College Square, Calcutta

1086. M. D. B., Mhow—Your enquiry is receiving our attention.

1087 S. R. R., Nizamabad—For securing agency go through the Sale and Exchange columns of "Industry." Pictures may be bought of Bombay Fine Art Gallery, 69, Esplanade Road, Bombay; Roy Babajee & Co, 182, Lower Chitpur Road Calcutta and J. D. Bevan & Co, Charing Cross, Lahore.

1088 K. K., Tunukur.—For learning tailoring by post write to D. N. Bakshi & Sons Abbottabad and Bengal Tailoring Institute, 14, Raja Nobo Kissen Street, Calcutta. For books on tailoring enquire of Thacker, Spink & Co, 3, Esplanade East, Calcutta.

1089 M. C. B., Sholpur.—For books on electricity try Thacker, Spink & Co.

1090 K. N. S., Tiruttani.—Wants to buy unbreakable glass for watches.

1091 B. V. R., Madras.—Pill making machines may be bought of Oriental Machinery Supply Agency Ltd., 201, Lall Bazar Street, Calcutta.

1092 C. P. D., Wadhwan City.—Optical goods may be bought of General Opticals Co., 511, Vernon, New York and Stevens & Co, Inc., Providence, Rhode Island, both of U. S. A.

1093. S. A. C., Shanmuganathapura.—You need not take any special license for selling patent medicine. Jewellers' tools are imported by L. Basak & Co., 5, Old Court House Corner, Calcutta.

1094. S. H. A., Bombay—Umbrella fittings may be bought of Nafar Ch. Attar, 43, Armenian Street, Calcutta.

1096. K. S. S., Russelkonda.—Wants to be put in touch with dealers in moonstones.

1097 M. C., Naini Tal.—An article on Process Blocks for Printing appeared in February, 1923, issue

1099 U. D. S., Raghunathpur.—Sodium silicate is used as an adulterant of soaps—boath washing and perfumed. It is added at the end but before pouring into frames. Soap making apparatus may be bought of C. S. Manan 82, Machua Bazar Street, Calcutta. Rats will be completely driven away from any building by smearing the rat holes which are found near the walls, in the cellar, with tar. In 24 hours there will not be found a rat about the house; nor will they return while fresh supplies of tar are kept about the holes

1100. K. K. H., Tavoy—Fly-shuttle looms may be bought of Bros. Partner, 35, Ezra Street, Calcutta. Silk yarn be bought of Jethmal Dhalamall, 71, and 712, Lindsay Street and K. D. Hariram & Co., 10A Lindsay Street; both of Calcutta.

1101. S. A. C., Shanmuganathapuram.—For your requirements regarding German goods write to Gebruder Tuchmann, Nurnberg, German. Optical goods may be supplied by Kyra Werk Fr. Kiessling, Rathenow; Pfeifer and Will, Nanborn bei Wetzlar and Gebr. Buhnenmann Rathenow E., all of Germany. Watches may be supplied by Y. V. Hasegawa and Co., Tamayacho, Nagoya; K. Hattori and Co., Ginza Shichome, Tokyo and Mikimoto Pearl Store, 8, Zinza Sanchoime Kyobashi-ku, Tokyo; all of Japan. Optical goods may be supplied by Asanuma & Co., 16, Honcho, Nichome, Nihonbashi-ku, Tokyo, Japan. For securing agency write to firms mentioning your line of business and bank and other references. Addresses of firm willing to open agency will be found in "Commercial India."

1102. S. M. M., Moulinein.—Try vulcanizing for making cushion air-tight.

1103 M. N. S., Mingyam.—Try the recipe of zarda that appeared in June 1923 issue of "Industry". An article on cigarette manufacture will appear in an early issue.

1104 A. H. N. D. S., Triplicane.—To communicate with any querist write him with name and number under care of "Industry" when those letters will be duly redirected.

1106 S. P. K., K. M. Bros., Rangoon.—Tablet making machines may be bought of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta

1108 J. R. R., Rohtak.—The address of the magician was given in the May issue of "Industry."

1112 A. P. P., Sihora.—The following is a list of some of the rice mills of Bengal: (1) Annapurna Rice Mill, Tollygunge; (2) Bararat Lakshmi Rice Mill, Tollygunge; (3) Doorgapore Rice Mill, Alipore; (4) Eastern Rice Mills Co. Ltd, Jhalakati, Barisal and (5) Indra Narayan Sil's Indra Rice Mill, Kolaghat, Midnapore.

1114 R. V. D., Bombay.—There is no arrangement for education in marine department in India.

1116. R. V. D., Gwalior.—You may start a match factory with Rs 3,000 as initial capital, Match machines may be supplied by Bhawani Engineering and Trading Co., 122/1, Upper Circular Road, and Bengal Small Industries Co., 91, Durga Ch. Mitter Street; both of Calcutta.

1118. C. S. M., Channapatna.—Silk and silk wastes may be bought of K. D. Hariram & Co., 10A, Lindsay Street, Calcutta; J. M. Kapadia and Sons., Hornby Road, Bombay; S. C. Basak and Sons, 109/1, Dasaswamedh Ghat, Benares and S. S. Bagchi & Co., Khagra, Murshidabad.

1120. D. P. D., Bolpore.—Process of making tea tablets appeared in July 1923 issue. Coffee tablets may be made in the same process. Knitting machines may be bought of Economic Hosiery Mills Co., 55/2, Dharamtala Street and Indo-Swiss Trading Co., 27, Pollock Street; both of Calcutta.

1121 S. A., Warangal.—Rosin may be had of Chowdhury & Co., 77-P, Clive Street and J. C. Gooner and Sons., 25/26, Clive Street; both of Calcutta.

1122 S. C. P., Tittirula.—Process of colour printing in red, blue and black appeared in December, 1924 issue.

1123 P. D. I., Karera.—For aluminium sheets try Balmer Lawrie & Co., 103, Clive Street and Ghosh & Co., 71, Clive Street, both of Calcutta.

1124. R. L. C., Nasirabad.—For removing pitch and catechu stain try with lemon juice.

1125 K. L. D., Gohana.—For disposing of the articles advertise in the pages of newspapers and periodicals. Wants to be put in touch with dealers in butter in Aligarh and Khurja.

1126 D. M. M. P., Dindigul.—You may correspond with the following service securing agencies; (1) Service Securing Agency, Delhi; (2) Service Securing Agency, London, House, Lansdowne Road, Applo Bunder, Bombay and (3) Employment Bureau, Kirloskar Theatre, Poona. Cinema apparatuses may be bought of J. F. Madan & Co., 5, Dharamtolla Street, Calcutta and G. H. Jeewa & Co., Pagoda Road, Bassein, Burma. Process of producing lime light will appear in an early issue.

1129 K. D. B., Gola.—Sugar manufacturing machines may be supplied by Burn & Co., 7, Hastings Street, Calcutta.

1137 B. A., Chicacole.—You may learn motor engineering in Indian Automobile Institute, 75, Bentinck Street, Calcutta Electrical engineering is taught at Bengal Technical Institute, Jadavpore, Dhakuria, 24-Paraganas, and Bengal Engineering College, Shibpore, Howrah.

1139 V. P., Pandharpore.—Cair ropes may be bought of Gokuldas Prushtamdas & Co., and Pragjee Jayaram Tanna, P. O. Box 32; both of Cochin.

1140 K. B., Saheb Nagar.—Can supply jute in large quantity. Process of preparing soap powder will appear in an early issue.

1141 T. B., Pilibhit.—Carnauba wax is a natural product found in South America. Refuse of galls cannot be utilised. You may use ordinary beeswax for carnauba wax. Indigo sulphate in powder form may be bought of B. K. Paul & Co., 1/3, Bonfields Lane, Calcutta.

1143 R. P. M., Karachi.—The required address is the Swiss Exporter, Chamber of

Commerce, Berne, Switzerland. Hosiery goods may be supplied by Genz Wheeler & Co., and Wai San Knitting Co. Ltd.; both of Victoria, Hongkong. Piece-goods may be supplied by Bezzi Antoniofigli, V. Tavolini 6 and Rava Ettore, Duomo 14; both of Florence, Italy.

1144 A. P. R., Jhulagah.—Blocks of all sorts are made by the Calcutta Fine Art Printing Syndicate, 147, Baranoshi Ghosh Street and Bharatvarsa Half-tone Works, 201, Cornwallis Street; both of Calcutta. For picture postcard printing write to the Calcutta Fine Art Cottage, 76, Dharamtala Street, Calcutta and Ernest Keils Nachf G. m. b. H., Leipzig, Germany.

1147 B. A. A., Muttra.—The following is a list of some of the newspapers and periodicals of Madras: (1) Hindu, 100 Mount Road, Post Box 316, (2) Daily Express, 14 Mount Road; (3) Education Review 4 Mount Road and (4) Madras Mail, 6 North Beach Road. For a complete list consult Thacker's Indian Directory to be bought of Thacker Spink & Co., 3, Esplanade East, Calcutta. Can supply used up stamps.

1148. J. C. D., Jorhat.—Refer your query to Calcutta Advertising Agency, 15, College Square, Calcutta. For blocks see No. 1144 above.

1149 M. N., Anuppupalayam.—For starting business with a small capital please go through the New Idea Columns of "Industry" where you will get some practical suggestion for starting small industries.

1151 D. C. P., Lyallpore.—Animal charcoal is obtained by charring bones of animal.

1153 N. D. S. Anuradhapore.—Motor and cycle accessories may be bought of Wellington Cycle and Motor Co., 61, Appollo Street, Fort Bombay; Standard Cycle Co., 59 to 59-5 Harrison Road, Calcutta and Motor and Stores Broadway, Madras.

1155 M. B. C. Pyinmana.—You may write to Arcadian Tobacco Co. Ltd., Calcutta.

1160 G. L. V., Neemuch.—Refer your query to Martin & Co., 6, Olive Street, Calcutta.

1162 K. S. N. Madras.—Ruling ink and litho printing ink may be bought of John Dickinson & Co., Lall Bazar Street, Calcutta. Sticking plaster may be had of Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta. Phenyle may be bought of B. K.

Paul & Co., 113, Bonfields Lane, Calcutta. For ink manufacture consult a book on Ink by Mitchell to be had of Chackerverty Chatterji & Co. Ltd., 15, College Square, Calcutta. Process of dyeing with khaki colour appears elsewhere in this issue.

1163 K. S. N. S., Salem.—Your query being in the nature of an advertisement should not be published in these columns.

1164 R. A., Kumta.—Yes, gunny cloths may be woven on hand looms. For looms enquire of Principal, Government Weaving Institute, Serampore, Howrah. Try the formula and see the result.

1165 E. A., Bangalore.—Hosiery goods may be supplied by Bombay Eastern Hosiery Works, 60 and 3 Abdul Rehman Street; Bombay, E. B. Bros. & Co., 11 Dharamtala Street, Calcutta; Kareem Mahomed, Abdul Kader & Co., Elphinistone Street, Karachi and Berry Bros. & Co., 586, Berry Bldg., Parson's Road, Lahore.

1166 C. V. V., Triplicane.—Umbrella cloths may be had of Tincori Dulalchand Basack, Khenraputty, Barabazar, Calcutta and Tej Gopal Bridhichand 71, Armenian Street, Calcutta. Umbrella fittings may be supplied by Nafar Ch. Atta, 43, Armenian Street, Calcutta. For the required machines try Oriental Machinery Supply Agency, 201, Lall Bazar Street, Calcutta.

1167 S. A. W., Niwar.—Tailoring is taught in Bengal Tailoring Institute, 14, Raja Nabokissen Street, Calcutta and D. N. Bakshi & Sons, Abbottabad.

1168 L. G., Gadag.—Process of preparing gold size appears elsewhere in this issue. Please explain clearly what you mean by drop black.

1170 S. H. H. R., Mahmedabad.—White on is a mineral oil obtained in mines of U. S. A. Refer your query to Latent Light Culture, Tinnevely. Lace making machines may be bought of Oriental Machinery Supply Agency, 201, Lall Bazar Street, Calcutta.

FOR PUJA AND DEWALI

if you want to profitably deal in or manufacture the attractive ~~fire-works~~ Pharaohs Serpents and magic wire correspond with—

THE DARBAR TRADING & MFG. CO.,

Katra Nihal Singh, Amritsar,

(Punjab)

1171. S. P., Jammu.—For registration refer your query to P. Lodge & Co., Post Box 6772, Calcutta.

1172 S. K. B., Gaya.—Formulas of face cream appeared in July 1924 issue. Recipes of face powder and hair curling lotion will be found in September 1924 issue. Refer to No. 1170.

1173 A. S., Poona.—Darjeeling teas may be bought of Bhattacharya & Co Ltd., 64/1, Cornwallis Street, Durgahari Tea Co. Ltd, 172, Bowbazar Street and Hajee Ahmed & Sons, by 24 and 25 Municipal Market; all of Calcutta. Nilgri tea may be had of Binny & Co. Ltd, Armenian Street; Parry & Co., 1st Line Beach and Lipton Ltd., 2nd Line Beach; all of Madras. Cigars may be supplied by Victoria Cigar Works, C-4, Tseekai Maung Taulay Street and Swami & Co, Sofaers Bldgs; both of Rangoon, Burma.

1174 K. S. S., Azhikkal.—For preparing sugar from molasses go through a bulletin by Mr Hadi on the subject published by the U. P. Government, Allahabad.

1175. P. N. G., Kanchrapara.—Wants a journal dealing with magic.

1176 N. B. R., Calcutta.—Tea may be bought of Rup Narain Jai Narain, Maithan Street, Agra; Pragdas Damodardas, Chowk Bazar, Allahabad and T. K. and P. K. Mudaliar, Hyderabad.

1177. D. N. C., Noakhali.—Hand power rice husking machines may be bought of Ghatak & Co., Rai Bahadur Road, Behala. Coconut coir making machines may be supplied by Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta. Refer to No. 1170 above.

1179. S. R. C., Rajkot.—For industrial books enquiry of Chackraverty Chatterjee & Co, Ltd., 15, College Square, Calcutta. An article on toddy will appear in an early issue.

1180. P. N. S., Dumkal.—Dissolve sacchrine in distilled water.

1181. M. R. B., Shillong.—Recipes of soft solders will be found in July 1924 issue.

1182. S. M. Z. U., Mutree.—Type-writer spare parts may be supplied by Adlerwerke Vorm, Heir, Kleyer A. G., Zimmerstrasse, 92-94, Berlin, S. W., Germany; A. E. G. Schreibmaschinen, G. m. b. H., Nanerstrasse 83-84, Berlin W., Germany; American Writing Machine Co., Inc., Newark, New Jersey, U. S. A.; F. S. Webster Co., Boston, Massachus-

setts, U. S. A.; Alexander Typewriter Co., 187, Westminster Bridge Road, London, S. E. and Hammand Typewriter Co., 75, Queen Victoria Street, London, E. C. 4.

1183. G. P. A., Hathras.—For starting business with small capital go through New Idea columns of "Industry."

1185. R. S. C., Travancore.—Motors and tyres may be supplied by Motor Emporium Ltd., Grant Road, Bombay and Ford Automobiles Ltd, Hughes Road, Bombay.

1186. L. A., Irinjalakuda.—For syrup manufacture go through the book on the subject published from this office. You may go through Theology, S. P. C. K., Northumberland Avenue, London, W. C. 2 and Theosophist, 9, St. Martins Street, London, W. C. 2.

1187 K. C. D., Nizamabad.—For the required machine try Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta.

1188. E. T. C., Bezwada.—For hair oils go through booklet on the subject published from this office. Threads may be bought of E. B. Bros & Co., 11, Dharamtala Street, Calcutta. Process of re-inking typewriter ribbons appeared in April 1925 issue.

1189 N. S. B., Ajmer.—There is no such person who will help you in your commercial training in the West.

1190 L. K., Rajahmundry.—For disposing of manganese ore try Mather & Co., 102, Clive Street, Calcutta.

1192. N. A., Dirba.—For expert opinion regarding agricultural machinery write to Kirloskar Brothers, Kirloskar Vadi, Bombay Presidency. Seek expert opinion of local well-digger. There is no such agency known to us.

1193. C. B. D., Nadiad.—Your query is receiving the attention of our experts.

1195. H. R. D., Sihawa.—For shares of match factory write to the Industries Department to the Government of Mysore, Bangalore.

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ORIGINAL HOMEOPHARMACISTS.

42, Strand Road, Calcutta.

Dealers in Original Homoeopathic dilutions and Biochemic Triturations.

Catalogue Free on Application.

For driving away flies use insecticides on a liberal scale.

1198. N. A., Dirba.—Agricultural machineries are manufactured by Kirloskar Brothers Ltd., Kirloskarvadi, Bombay Presidency; Oliver Chilled Plow Works, South Bend, Indiana and Wiard Plow Co., Batavia, New York; last two of U. S. A.

1199. G. K. G., Dighirparh.—Can supply Indian herbs and vegetables used in Ayurveda.

1201. P. B., Narasarowpet.—For the required apparatus try P. Mukherjee & Co., 29-31, College Street Market, Calcutta.

1203. Illegible.—Refer your terms to Central Bank of India Ltd., 99, Clive Street, Calcutta.

1204. S. M. Z., Murree.—Tools may be bought of N. G. Mitra, Chandney Chawk, Calcutta.

1205. N. R., Nasriganj.—An article on ceramic industry appeared in the last issue.

1207. M. R. M. C., Amritsar.—Woollen yarns may be supplied by E. Lockfeer, Hulst, Holland; Fischer & Co., Market Gasse 8, Berne, Switzerland; Burberrys Limited, 8/10, Boulevard Malesherbes, Paris, France.

1208. M. L. G., Shwedaung.—Recipes of blue and green colours appear elsewhere in this issue.

1209. M. G., Bhowra.—An article on the uses of talc or soapstone appeared in December 1921 issue. Grain alcohol and cologne spirit may be supplied by B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. Stoppered glass phials may be bought of C. K. Das & Sons, 17, College Street, Calcutta. Capsules may be had of P. S. Dutt & Bros., 8, Ezra Street, Calcutta. Card-board boxes are manufactured by Bengal Card-board Box Manufacturing Co., 64/1, Mechna Bazar Street, and H. L. Sett & Sons, 8, Nilmony Mitter Street; both of Calcutta. Lard and tallow may be supplied by Calcutta Tallow Mart, 19, Tiretta Bazar Street, Calcutta. Foreign consulates do not deal in any articles—they only furnish commercial information regarding trade development between their respective countries and India. You may try the formulas and report your difficulties when we will try to solve those. You may try the formula of washing soap that appears elsewhere in this issue. No further information regarding cattle fodder from saw dust is available now.

1210. P. M. U. S., Dacca.—Small wooden boxes may be bought of A. Krishmann & Co., 6, Gauribarea Lane, Shambazar, Calcutta. Ink pots are manufactured by Calcutta Glass & Silicate Works, 101, Cornwallis Street, Calcutta.

1211. G. A. B., Nagpur City.—Glycerine is mainly used in manufacturing explosives, medicines and toilet articles. Turkey red oil is used in dyeing. Boot polish may be supplied by Chandra & Co., 70, Bentinck Street, Calcutta. Boot laces and rubber heels may also be supplied by the above firm. Playing cards are manufactured by Russell Playing Card Co., New York and United States Playing Card Co., Cincinnati, Ohio; both of U. S. A. Toilet requisites may be had of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. China wares and glass wares may be supplied by Satya Charan Paul, 194, Old China Bazar Street, Calcutta.

1212. R. B. S., Boha.—For technical education write to Bengal Technical Institute, Jadabpur, Dhakuria, 24, Paraganas, Bengal and Victoria Diamond Jubilee Hindu Technical Institute, Lahore.

1213. T. S., Tuni.—Match splints and veneers may be supplied by Sunderban Match Works, 12, Dalhousie Square; Bhowani Engineering and Trading Co., 122/1, Upper Circular Road, and Bengal Small Industries Co., 91, Durga Charan Mitter Street; all of Calcutta.

1219. T. V. V. P., Rajahmundry.—Thank you for your good suggestion. Efforts are being made for supplying your requirements.

1220. B. B., Jodhpur.—A formula of good laundry soap appears elsewhere in this issue.

1221. M. M. G., Jhenidah.—The address of Petroleum World is 32, Great St., Helen's, E. C. 3 London. You will get other information relating to Petroleum from the above journal. For technical books in Bengali write to Messrs Gurudas Chatterjee & Sons, 201, Cornwallis St., Calcutta. Your other queries not being in our line are irrelevant. Some of our advertisers can procure the degrees for you. For addresses of agents to German trade papers you are referred to the advertisement pages.

1223. T. P. V. P., Pattukkottai.—An article on crayon manufacture appeared in October, 1921 issue.

1224. B. O. S. Co., Rangoon.—Your name has been entered in our directory for future reference.

1225. S. S. R. P. D., Quetta.—Formula of good, washing soap appeared in August 1921 issue. We do not deal in any article; we only furnish information to our constituents. As a rule no scent is used in washing soap.

1226. A. C. P., Dharmaj.—A series of article on Export Trade appeared in 1st and 2nd volumes of "Commercial India." Another series on Import Trade will soon appear.

1227. K. E. K., Godhra.—You may go through Lac Production Manufacture and Trade by Mr. J. E. O'Connor to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta.

1230. N. N. Kashmir.—Hides and skins are imported by H. Alexander & Co., Ltd., 44-46, Leadenhall Street, London, E. C. 3; F. F. Jones & Co., 95, Soth Street, Boston, Massachusetts, U. S. A. and J. C. Altmann, C. Hartenstrasse 41 Berlin, Germany. For a complete list of addresses go through January 1924 issue of "Commercial India," the sister journal of "Industry."

1231. A. S. A. Co., Ludhiana.—Gunny bags and hessian may be had of Bhagatram Sheoprotap, 26/3, Armenian Street and Madhu Lall Doagar & Sons, Doagar House, 37, Canning Street; both of Calcutta.

1234. N. H. M., Bhavnagar.—For hair oil manufacture you may consult a booklet on the subject published from this office.

1236. N. H. M., Bhavnagar.—For printed tin cans try Higashidani & Co., 17, Ichome, Kitahorie, Kamidore, Nishi-ku, Osaka, Japan and Dyson William & Co., Ltd., Devonshire Grove, Old Kent Road, London, S E 15

1239. A. R., Willawalla.—We do not deal in any article; we only furnish information to our constituents. Addresses of motor accessories dealers appear elsewhere in these columns.

1240. P. V. N., Nellore.—Consult Kaviraj Ath Sen, Kalpataru Ayurved Ashram, Grey Street, Calcutta.

1243. S. M. D., Madras.—No other economical process of purifying copper is known to us.

1244. V. A. R., Inkurichi.—For label printing write to Calcutta Fine Art Cottage, 76, Dharamtala Street, Calcutta. Addresses of Indian newspapers and periodicals will be found in Thacker's Indian Directory to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta.

1249. R. P. G., Katni.—Can supply red and yellow ochres, soap stone, lime stone, white chalk, China clay, kaolin, general forest product, bauxite and iron and manganese ores.

1250. C. S., Palamcottah.—For opening agency of salt write to Sheriff Damji & Co., 9, Zakariah Street, and Sidhmull Ram Kumar Goenka, Basak Street; both of Calcutta.

1251. R. K. H., Aijal.—Buy a draft from a bank that has branch in U. S. A. and send it to the party concerned. For hats enquire of Mohamed Ebrahim K. E. Aliar V. S. & Co., 1/4, Municipal Bazar, Rangoon, Burma. Fancy goods may be bought of M. E. Dadabhoy & Sons, 96, Dalhousie Street and E. E. Aboo Brothers, 18, 26th Street, both of Rangoon, Burma.

1253. P. B., Sawantwadi.—The addresses you require are not traceable. Thank you for your valuable suggestion.

1254. A. R. T., Calcutta.—Flowers of sulphur are obtained when distilling impure crude sulphur. On passing sulphuretted hydrogen through a solution of antimonious chloride, this sulphide is thrown down as an orange coloured precipitate. It is employed in the mixtures employed for making the heads of lucifer matches and also in the preparation of fireworks.

1255. G. S. S. N., Madras.—For rice millers, etc, try Marshall Sons, & Co. Ltd., 99, Clive Street, Calcutta, Douglas and Grant Ltd, Merchant Street, P. B. 459 Rangoon and Macbeth Bros & Co Ltd, 1/2, Hare Street, Calcutta.

1256. H. C. D., Benares City.—You may consult Hair Oil Manufacture, Syrup Manufacture and Indian Pickles, Chutneys and Morabbas published from "Industry" Book Department, 22, Shambazar Bridge Road, Calcutta.

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K. M. DAS & Co.

29-1, Telepara, Sampooker St., Calcutta.

1257. K. S. N., Madras.—For sticking plaster try Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta. Phenyle may be bought of any chemist. Recipes of hair dyes appeared in January 1925 issue. Other recipes you require will appear in an early issue.

1258. P. S. C., Dindigul.—For tea essence try Economic Supply House, Ahiran, Raghunathganj, Murshidabad. Die soap is not manufactured in India.

1259. P. N. P., Kumbakonam.—Please explain your difficulties in English.

1261. S. K. J., Sevalia.—The diameter of the bamboo from which whistles are made is from 1 to 1½ inch. It will be advisable for you to call a local carpenter and explain him all the directions given in the book.

1263. G. C., Katmondu.—To communicate with any querist write him with name and number under care of "Industry" when your letter will be duly redirected.

1264. K. S., Jaipur.—Gold is purified in nitric acid. Vacuum pan is available in market. There is arrangement for boiling at certain pressure desired. Tw means tweedle which indicates certain measure in a hydrometer. Amla is embelic myrobalan. Melt the paraffin and pour on the table and make the surface smooth by scraping. As regards New India. Prize competition you are to make a complete survey of the industries of your and other surrounding villages.

1265. M. G. R. M. P., Madras.—Can supply coconut and chewing tobacco in very large quantities.

1269. B. K. M., Jagadhri.—Matches may be bought of Lalehand Brothers, Match Depot, 33A, Central Avenue and H. Rashid. & Co., 15, Zakariah Street; both of Calcutta.

1271. F. R. L., Jullundur.—The address is not traceable.

1272. U. C. B., Simla.—Wants to be put in touch with fruit dealers of Bombay and Calcutta.

1273. N. K. J., Almora.—For good printing write to Calcutta Fine Art Cottage, 76, Dharamtola Street, Calcutta.

1276. A. K. N. H. Bros, Dindigul.—Locks may be bought of Dinshaw Mehta & Co., 11, Hare Street, Calcutta. For tanned skins used in book binding enquire of V. Purasatham & Co., 62, Amherst Street, Calcutta. For blocks

try Calcutta Fine Art Syndicate, 147 Baranov Ghose Street, Calcutta. For dies enquire of Mohila Press and Process Engraving Works, 27/29, Pataldanga Street and Traill & Co. Ltd., 20, British Indian Street; both of Calcutta.

1277. K. G. S., Rajkot.—Process of enamelling gold appeared in August 1923 issue. Enamelled wares may be bought of R. D. Datta & Bros, 86/4, Harrison Road, Calcutta.

1279. J. A., Bodinayakanur.—For iron posts and railings try Anandji Haridas & Co., 20, Darmahatta Street and Calcutta Builder's Stores Ltd., 226/B, Bowbazar Street; both of Calcutta.

1280. B. K., Mysore.—Process of preparing incense sticks appeared in May 1924 issue.

1281. P. A. S., Masulipatam.—Your enquiry is receiving our attention.

1282. K. M. C., Tuticorin.—Ribbons may be supplied by E. B. Bros. & Co., 11, Dharamtala Street, Calcutta; National Ribbon Co. New York, U. S. A. and Star Ribbon Manufacturing Co., Astoria, New York, U. S. A. Ribbon making machines are manufactured by Ateliers de Construction de Ruti, succession de Gaspard Honegger, a Ruti, Zurich, Switzerland. Rubber balloons may be bought of Ali Mohamed Akber Ali, 22/1, Lower Chitpur Road and K. A. E. Sadka, 7 Colootola Street; both of Calcutta. Goggles may be supplied by Willson Goggles Incorporated, Reading, Pennsylvania, U. S. A.

1283. A. R. S., Kangra.—The address of Industrial and Trade Review for India is 104 Reichstrasse, Berlin—Charlottenburg, Germany.

1284. T. V. R., Amalapur.—Knitting machines may be supplied by Leighton

SOAP AND PERFUME MANUFACTURERS.

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SAMPLES**

of perfumes for above trade will be sent on receipt of the inquiries from bonafide manufacturers. Excellent qualities of the highest strength.

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155, Juma Masjid Circle, P. O. Box 2082,
BOMBAY.

Machine Co., Manchester, N. H. and H. Brinton & Co., Philadelphia, Pennsylvania, both of U. S. A.

1285. H. T., Bhavnagar.—Pill making machines may be had of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

1286. C. J. S., Udumalpet.—Sugarcane crushing machines may be supplied by Burn & Co., 7, Hastings Street, Calcutta.

1287. N. J. D., Dharmgadhra.—For estimates of printing machines, etc., write to K. Banerjee, 133, Canning Street, Calcutta. For estimates of types and other materials enquire of Ashutosh Auddy & Co., 16, Lower Chitpur Road, Calcutta.

1288 S. K. N., Bobichettipolim.—You may place order with Calcutta Glass and Silicate Works, Belgachia for ink-pots.

1291 R. G., Ayakudy.—For securing agency go through the Sale and Exchange pages of "Industry." Yes, you may preserve coffee tablets for some months. Coffee tablets may be bought of Economic Supply House Ahiran, Raghunathganj, Murshidabad. Wooden-boxes are manufactured by A. Krishmann & Co., 6, Gauribarea Road, Shambazar, Calcutta. The following newspapers will be of interest to you: Akbar-i-Islam, 210, Memonwada Road, Mandvi; Bombay Samachar, 117, Frere Road and Indu Prakash, 388 Girgaum Road; all of Bombay. **Seek legal advice.**

1293. B. M. F., Secunderabad. Process of preparing photo plates appeared in February 1923 issue of "Industry". An article on paper manufacture appeared in the last April issue. Photo materials may be supplied by Calcutta Camera House, Chowringhee Calcutta. For the required book write to Chackravartty Chatterjee & Co. Ltd., 15, College Square, Calcutta. Your other query is unintelligible.

1295. M., Bombay.—Syrup will not keep long unless rectified spirit is added to it. As regards taking licences for stocking rectified spirit write to the Excise Superintendent of your district. Rectified spirit is to be added last. In cases of fruit juices sodium benzoate alone would do. Preferably citric acid should be used in preparing artificial lemon syrup. Cassia leaves are "tejpat." Specific gravity of syrups may be increased by boiling.

1297. H. K. S., Simla.—Please explain your query more clearly.

1298. G. S., Kotah.—Answers to your queries appeared in the last issue. It is not possible to buy pistols without taking licence. For dhunni machine and multithread charka write to Khadi Pratisthan, 15, College Square, Calcutta.

1299. S. N., Kyaikto.—Wants to purchase Bahadur watches.

1300. S. D., Ajmer.—Reply to your queries appeared in July issue under No. 991.

1301. A. N. K. C., Amritsar.—Gunny cloths may be bought of Adamjee Hajee Dawood & Co. Ltd., 55, Canning Street and Madhulal Doogar & Sons, Doogar House, 37 Canning Street; both of Calcutta.

1303. G. L. N. B., Anakapalli.—For German magazines write to The Jubilee Trading Co., Triplicane, Madras.

1304. S. A., Warangal.—Wants to be put in touch with dealers in packing timber.

1305. S. R. R., Anantapur.—Refer your queries to M. Bhattacharjee & Co., 79, Clive Street, Calcutta.

1306. J. K. D., Chittagong.—Wants to purchase empty kerosine tins. Refer to No. 1301 above.

1307. S. K. P., Ayakudy.—Process of preparing various kinds of artificial essences used in the manufacture of mineral water appeared in October 1924 issue.

1308. R. T. H., Atjat.—It is advisable for you to import German goods through importers. You may try Singh Sarkar & Co., 125, Harrison Road, Calcutta for the purpose. Try to secure eggs locally. For Singer Sewing machine write to Singer Sewing Machine Co., Dalhousie Square, Calcutta. Your other queries appear elsewhere in these columns.

1310. B. A. S., Prome.—For the required machine write direct to the advertiser.

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Trade Enquiries.

[To communicate with any party write him direct with name and address given below, mentioning INDUSTRY]

1054. S. Krishna Swami Aiyer, Thiruvallangadu, Post Narasinganpetai, Tanjore District. Wants to be put in touch with an expert in the Central Provinces or elsewhere with experience in preparing chemical gold.

1233. T. K. Shah, Petlad. Wants to be introduced to suppliers of seeds of the following trees: (1) phulwara, (2) illipitree, (3) gracinia tree, and (4) balipolia tree.

1237. Qazi Nazeer Hussain, Manager of Reyasut Nagar, Untari, Palaman. Wants the service of a technical student with commercial knowledge to handle oil crushers, flour mills, rice hullers and other machineries.

1242. Ma Ma Gyi & Sons, 32nd Street, Mandalay. Desire to be put in touch with velvet dealers, locks for leather suit case dealers, leather suit dealers of Aligarh and Cawnpur and silk cloth dealers at Bangkok, Siam.

1309. G. C. Naidu, 32, Chick Bazar Street, Cantt. Bangalore Wants a partner who can invest or advance a loan of Rs. 5000 on a lucrative business, security and profit guaranteed.

1339. Provincial Import and Export Co., Chowk Road, Gaya. Want to establish trade relations for the sale of the following:—(1) moonj grass fibres of good qualities; (2) file dusts and stems of animal horns used for preparing gelatine; (3) dried tobacco leaves; and (4) senwal cotton.

1385. I. Fabian Fernandez, C/o. R. C. Chaplain, Keamari, Karachi, Sind. Desires to act as an agent to push the articles of the manufacturers and others in the Karachi markets. Specially desires an agency of good tea.

1394. Williamson & Co., Oldham Road, Gaya. Can supply clays of various types and buy and sell minerals and produce. Also wants sub-agents who can carry stocks of tree felling machines and a capitalist partner for general import business.

1283. Anant Ram Sharma, A. B. High School, Dehra Gopipur, Dist. Kangra. A graduate with chemistry and economics wishes to serve as an apprentice in some industrial concern.

SEPTEMBER ISSUE OF INDUSTRY.

In the Press.

The September Special issue of **INDUSTRY** which will appear in the first week of September will contain articles on Reconstruction of Indian villages, Date of Palm Sugar, etc. in addition to the usual features such as small Trades, Formulas, Topics, etc., etc. Any friend of our subscribers may get a copy as sample on application to the Manager, Industry, Shambazar, Calcutta.

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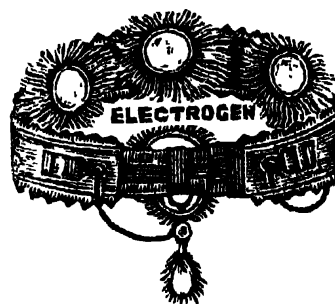
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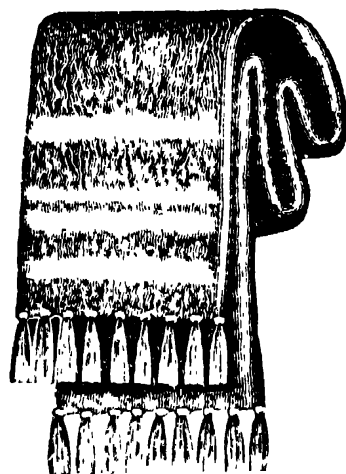


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Industry

A JOURNAL OF TECHNOLOGY, HANDICRAFTS & COMMERCE

VOL XVI.

CALCUTTA, SEPTEMBER, 1925

NO. 186

OUR VILLAGES.

WHAT are our villages—the producer of nation's wealth, supplier of nation's food, where our countless communities live scattered over countryside in sanitation and disease in poverty and misery? Dilapidated houses and caged huts surrounded by jungles, occupy the spaces between the village hovels where once were situated beautiful houses inhabited by prosperous people. Interminable quarrels cleaving the upper classes without proper education, the lower classes only given the charge of producing nation's food and wealth without any help and guidance from the intelligentsia of the nation, plying their age-old implements and their starving cattle—this is the picture of our villages. The labour without occupation and in the grip of the *Mohajians*, the landlords steeped in luxury and surrounded by people always weaving out schemes not to benefit the tenants but to supply his master's greed—that is the condition of our villages. And these are the

producers of the nation's food and wealth!

These were the villages which once produced artisans who made India famous for her metal wares, her stone wares, her glass and earthen wares, her wood works, her ivory and horn works, her lac and lacquer wares, her textile, embroidery and carpet works and above all and besides many others, her notable works of fine art which are still admiration of the world. The artisans who are still plying their age-worn implements are starving for want of work, want of improvement and want of intelligent and inventive guidance. The educated few on whom the country lays her hopes are flocking in the towns not for producing any wealth but for helping others—foreigners and exploiters to do it at the cost of the country.

How the old conditions can be reversed—how the artisans can be made to produce speedily and cheaply—how

the workers can be made to work more efficiently, more expeditiously with less expenditure of toil—how labourers can have permanent employment all through the year, are problems that confront the people of the country now when the competition with the world compells easy-going life a condition of by-gone days and survival of the individual as well as of the nation dependent upon the fittest brain and fittest muscles.

Imparting of practical education has become the first condition on which the progressive living of the nation as well as of the individual depends for its food and well-being. Physical fitness of each element of the people—every individual—requires sanitary surroundings, wholesome food, plentiful pure air and water, and consistent physical culture. These can be yours if you co-operate in the development of your village, of your houses and your surroundings.

Fitness of the body and of the mind to do the works of improvement and development, of creation and organisation of the wealth-producing industries is the demand of the country of her sons. Education and sanitation are the greatest need of the people but these require money and more money; and this the public coffer is unwilling to spend adequately, the rich men unable to lend or devote and the commoner cannot unite to organise.

The greatest need is that of money. The question is how this can be earned. In an agricultural country where agriculture is nearly the only occupation, the people is idle for about six months in the year, if not more. And unless

and until this forced idleness can be removed by showing the ways of new works, loss in the productive value of labour will continue unabated to the continued distress of the people.

We have to earn more money and spend less. Besides food we have to spend nothing so much as on cloth. We can save whole of this by spinning ourselves. As Mahatma Gandhi argues, there are 700,000 villages over the vast surface of India. The majority of the villages are not served by any railway system at all. There was a time when the spinning wheel was a supplementary occupation of this vast agricultural population. Eighty five per cent. of the population of India are agriculturists and for at least four months in the year they have absolutely nothing to do. These people should spin during this period of idleness.

Mahatma Gandhi claimed for spinning wheel on an average a production of 400 yards per hour. The highest output of a spinning wheel was 850 yards per hour. No mill spindle had yet produced 850 yards of 10 counts per hour. That could only be done by the human hand. What the mill could do was that thousands of spindles could be worked by a few with a great power behind it. It was good, it had its place. He did not want to displace the machinery from its proper place. He ventured to suggest that for these few millions of peasantry of India there was no other cottage occupation of that universal character as the spinning wheel.

No doubt of it but our industries need impetus and this impetus can only

to had from the educated classes joining hand and brain with the working classes to organise productions. The products of our artisans have speciality of their own which no Western competitor can imitate or emulate. But these require organisation for sale and production.

The villagers should first of all study the needs of the locality—the articles that the people get from outside the village area. If these can be got from the village attempt should be made to collect them. If not, co-operative stores should be started to supply these to the villagers and the profit earned devoted to the accumulation of a village fund. This is of course practicable for big villages, the number of which is by no means inconsiderable.

Attempt should be made to accumulate the time-honoured village incomes and Dharmagolas should be organised by self-contribution. When sufficient stock is collected loan of paddy

and sundry may be given out of them and the interest which *Mohajans* get from such lending should be collected at a lower percentage to the common fund of the village and subsequently devoted to better training and better organisation of the villagers.

We deal with all the phases of village improvement and development in subsequent pages. Development of physical health and productive industries is the first requirement in all our national endeavours. And when the villagers irrespective of classes are provided with suitable works, our inherent weakness and internecine disunion will come to an end. United effort should be the desire of all, and let our educated class go forth to the villages to preach this gospel of national endeavour and national union from the bottom—from the masses where the spirit of self-establishment and national endeavour should be broad-based.

WIPE OUT MONEY-LENDER--BUT ?

The money-lender gives a useful and necessary service, but his price is too high.

He is too greedy—too merciless. He saves you to-day but ruins you to-morrow. The sooner we wipe him out the better for the country-folk.

But who is to fill his place and do his job cheaply—humanely. We need someone in between the banker and the *Mohajan*.

Why not big villages start a service fund. Make an initiation with small monthly subscription—say 100 members to commence with one rupee a month. Commence actual service say after 5 years when you have accumulated a few thousands.

Begin with buying small debts of the members, giving service to shop-keepers, helping artisans to buy small implements and machineries, etc.

This is no experiment. We shall develop the working scheme in our next.

CHEMICAL UTILISATION OF WOOD.

OF the various processes employed for manufacturing chemical compounds from wood, that of destructive distillation is probably at present the most important. The industry is an old one and is quite well-developed in Germany, Russia, Norway and Sweden, and less extensively in France and England.

PROPERTIES OF WOOD AFFECTING YIELD OF PRODUCTS.

Methyl alcohol, acetates, acetone, charcoal, turpentine, wood oil, and oxalic acid are directly or indirectly obtained on a commercial scale from wood, and the yield is governed largely by the specific gravity, and kind of wood, as well as by the manner in which the manufacturing process is conducted. Many other farm products, such as sugar cane, jute stalks, corn stalks, straws, cotton stalks, etc., will yield these products and it is possible that many other wastes may in future

be utilised in this way. So far, however, but little attention has been given to these materials and for economic reasons they are not commercially employed.

SPECIFIC GRAVITY AND WEIGHT:—

Different kinds of wood have different specific gravities and even samples of the same species differ in this respect. Specific gravity figures are therefore of general value only and can not be considered as strictly applicable to any particular lot of wood. The weight of a cord of wood varies not only with the specific gravity of the wood but also with the way in which it is piled. It has been found that as a rule there is 44 per cent. of a vacant space in a cord of wood as usually put up, i.e., 44 per cent. of 128 c.ft. (a cord equal to 128 c.ft.) is vacant space while 56 per cent. of 128 c.ft. is only wood.

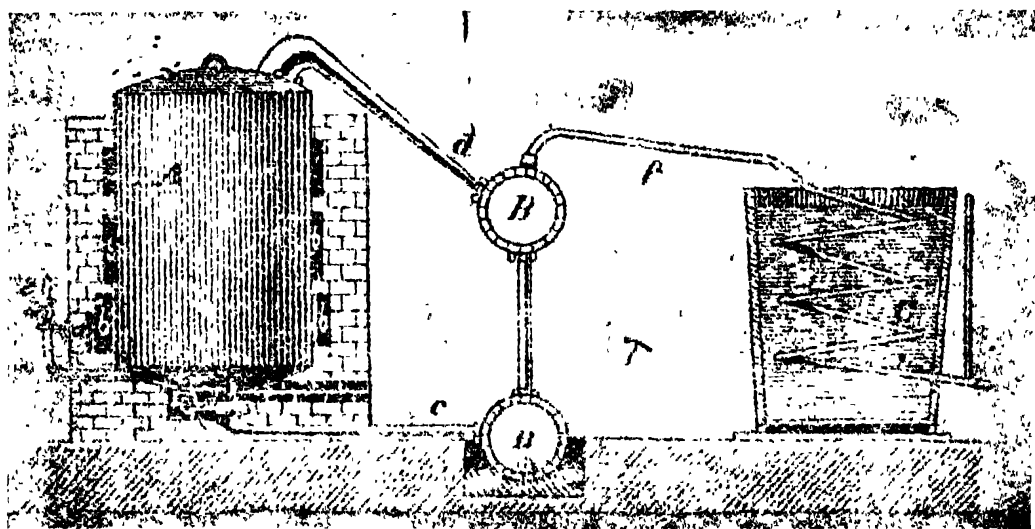


Fig. 1. Swedish Thermokettle—A. Retort, a. furnace, b. spiral flue, c. tarpipe, d. neck conducting the gases B. Drums where tar vapours condense and collect. C. Condenser, e. steam pipe, f. pipe conducting acid vapours to condenser.

WATER CONTENT:—The wood for the destructive distillation should be as dry as possible, as much time and fuel are wasted if green or wet wood must be dried in the retort and the temperature raised under such condition to the point at which distillation begins. For these reasons it is the best practice to cut and stock the green wood, which generally contains 20 to 50 per cent. of water, from eight months to two years before it is to be used in order that it may become well-seasoned. Even seasoned woods contain from 12 to 25 per cent. of water, which must be evaporated in the retort before the disintegration of the wood begins.

The capital required to maintain a two years' supply of wood necessitates the increase of the operating expenses considerably and drying ovens heated by the waste steam and gases of the plant have been used in some cases to dry the wood quickly before it goes to the retort. This is undoubtedly the better practice and whenever it is possible plants should be equipped with such drying ovens, thus decreasing the amount of capital invested in wood and at the same time securing large yields, as during seasoning by exposure wood loses weight from rotting and from the solution of water-soluble constituents, and consequently gives a lower yield of distillation products.

COMPOSITION:—There is no definite relation that can be established between the composition of woods and the chief distillation products obtained from them, namely, alcohol, acetic acid, acetone, and charcoal.

YIELD:—While any kind of wood may be used for the production of alco-

hol, acetates and charcoal, the hard woods give much larger yields than the soft woods, while resinous wood yield the most terpentine, wood oil, and tar.

APPARATUS FOR DESTRUCTIVE DISTILLATION.

DESCRIPTION OF EQUIPMENT:—The apparatus required for the destructive distillation of wood consists of:—

1. Retorts or ovens in which distillation is carried on and the chief chemical reactions involved in the production of the crude products take place.

2. Condensers in which the condensable vapors are liquefied.

3. Stills in which crude products are separated, concentrated and purified.

4. Mixing pan for the preparation of acetate of lime.

5. General apparatus—such as evaporating pans, storage tanks, coolers, pump, etc.

The various forms of kilns in which wood was formerly charred are of historic interest, especially in connection with the modern improved retorts; but as the yield of alcohol and acetate is very low even in the best kilns, these old forms are now only employed in localities producing charcoal iron, where charcoal is practically the only product recovered.

When attempts was made to cover and condense the volatile products an air-tight iron retort known as the "Swedish Thermokettle" set in brick work and connected with a condenser, was devised and is still quite extensively employed.

The plant may be assembled and arranged in any desired manner, but it is

highly desirable that full advantage be taken of natural conditions, that as much labour as possible performed by machinery, and that the whole establishment be conducted under the most rigid control, in order that the plant may be profitably worked and losses at any point quickly discovered.

TYPES OF CONDENSERS:—The condensers are of the greatest importance. They should be sufficiently large to condense all the products even under the most adverse condition as the material lost at this stage can never be recovered. For separating the constituents of the distillate a sample still, such as is used in the preparation of distilled liquors, may be used, although an iron still is generally preferred in distilling the alcohol and acetone from the acetate of lime. For the storage and settling tanks, it is customary to use wood; all

pipes, pumps, and other apparatus through which the acid liquors pass must be of copper or wood.

COST OF PLANT:—Only approximate figures can be given as to cost and quality of equipment for the destructive distillation of wood, as any figures would be greatly modified by the location of the plant, local cost of labour, freight charges, and completeness of equipment. The first cost of equipment may often be greatly reduced by cheap construction and by omitting labour and time saving devices in the apparatus. Builders of destructive distillation plants quote from Rs. 3,000 to 5,000 per day cord on a basis of 10 cord plant—a cord being a bundle of wood occupying 128 c.ft. of space.

GENERAL PROCESS OF DISTILLATION.

ROUND RETORT SYSTEM (FIG. 5):—The round retorts are filled with the

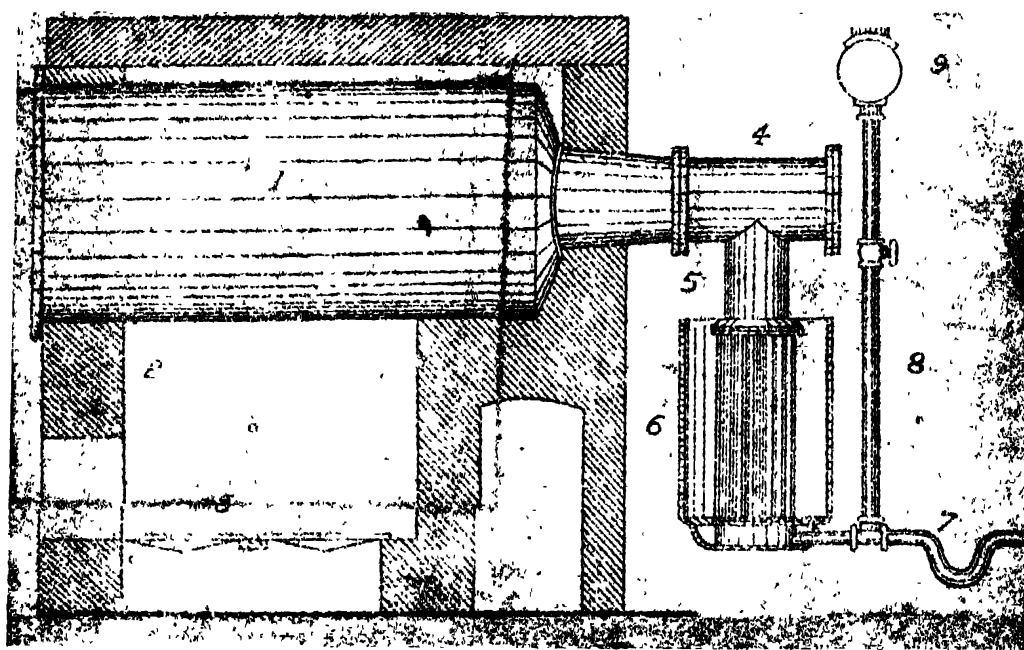


Fig. 2. Round Retort with Condenser—1. retort, 2. fire walls, 3. grate, 4. neck, 5. pipe to condenser, 6. condenser, 7. trapped delivery pipe, 8. gas pipe, 9. gas main.

wood filling a retort, which is made to hold about 1 cord. The retorts are heated slowly and the distillation is continued for from twenty to thirty hours, the progress being indicated by the flow liquor and the gradual heating of the front of the retort from top to bottom. When the entire front of the retort has reached a fairly uniform temperature, the fires are allowed to die down and when the retort or ovens are sufficiently cool the charcoal is removed. The time required for distillation as already stated varies from twenty to thirty hours, and averages about twenty-four hours. The distillate from the retorts passes to the condensers, when the acid, alcohol and other valuable constituents are condensed to liquid form and then carried to a large wooden settling tank which may be either underground or overhead, where it is allowed to stand for several days in order that the tar may settle. The uncondensed gases pass from the condensers to the gas mains, and are carried either directly to the furnace and burned there or go to a gas holder from which they are used. If the tar is not otherwise treated, it is blown under the boilers with a steam jet and burned.

NATURE OF THE REACTION IN THE RETORT:—When hard wood is heated, decomposition does not begin until the temperature has reached 150 deg. C. the loss below this temperature being water alone. With resinous woods, turpentine begins to distill with water at 97 deg. C. and continues to pass up to about 185 deg. C. overlapping with such products of destructive distillation as may begin to pass

over above 150 deg. C. Above this temperature (150 deg. C.) liquid products resulting from the decomposition of the wood are distilled. The total quantity volatilized, as determined by violette from moisture free hardwood at different temperatures is shown in the following table:—

Percentage of wood volatilized at different temperatures (violette.)

Temperature in centigrade	Amount Volatilised	Residue.
150 to 160	2.00	98.00
160 to 170	5.45	94.55
170 to 180	11.41	88.59
180 to 190	18.01	81.99
190 to 200	22.90	77.10
200 to 210	26.86	73.14
210 to 220	32.50	67.50
220 to 230	44.63	55.37
230 to 240	49.21	50.79
240 to 250	51.33	49.57
250 to 260	58.77	40.23
260 to 270	62.86	37.14
270 to 280	63.84	36.16
280 to 290	65.91	34.09
290 to 300	66.39	33.61
300 to 310	67.13	32.87
310 to 320	67.77	32.23
320 to 330	68.23	31.77
330 to 340	68.47	31.53
340 to 350	70.34	29.66
350 to 432	81.13	18.87
432 to 1500	82.60	17.31

From the above figures it appears that distillation is, for all practical purposes, complete at 430 deg. C, as the additional volatilization above this temperature is only about 1.5 per cent. The chief products are formed continuously throughout the entire process which

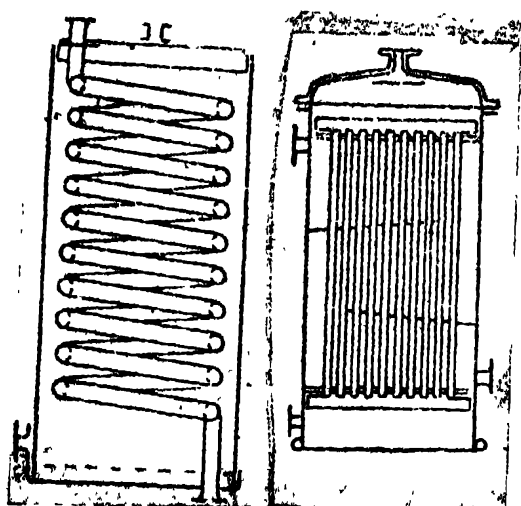


Fig. 3. Types of Condenser.

proceeds in three characteristic periods:—(1) at a temperature from 150 to 280 deg. C. acetic acid, methyl alcohol, and wood creosote are the chief products; (2) from 280 to 350 deg. C. large volume of gases is given off; (3) from 350 to 430 deg. C. solid hydrocarbons are distilled.

On the whole therefore it appears that while the yields of both alcohol and acid have reached the maximum at 300 to 350 deg. C, the formation of both continues up to 450 deg. C. beyond which it is useless to raise the temperature.

Experiments and experience have both shown a lower yield of acid and alcohol when the wood was rapidly heated than when slowly heated. Further when the vapours are evolved rapidly without provision for their prompt removal there is likelihood of considerable loss from blowing of the retorts, i.e., escape of gases around the door due to pressure within the retort.

CRUDE PRODUCTS OF DESTRUCTIVE DISTILLATION.

The crude products divide themselves naturally into four classes as follows:—

	Per cent.
1. Non-condensable gases	20 to 30
2. Charcoal	20 to 35
3. Tar and oils	5 to 20
4. Aqueous distillate or crude Pyroligneous acid	30 to 40

While the chief and most valuable products of hard wood distillation are charcoal, acetic acid, methyl alcohol, tar, acetone, a large number of other compounds are produced, such as formic acid, propionic acid and whole lot of others.

NON CONDENSABLE GASES:—Gases produced during distillation constitute from 20 to 30 per cent. of the wood and consist of about 53 per cent. of carbon dioxide, 38 per cent. of carbon monoxide, 6 per cent. of methane and the remaining 3 per cent. of nitrogen, hydrogen, etc. These gases are of such low illuminating power that they are usually either burned under the boilers or retorts or are wasted.

CHARCOAL:—The charcoal left in the retort when distillation is complete constitutes from 20 to 35 per cent. of the original weight of wood, the quantity depending on the kind of wood and the manner of heating the charge. The physical qualities and chemical composition of charcoal are governed chiefly by the temperature at which the wood is heated. When heated to about 280 deg. C. wood begins to be friable and has a

brownish black colour. At 310 deg. C. it is friable, takes fire readily and is black in colour. The coal becomes harder with further rise of temperature and is less readily ignited. As it is only 25 per cent. as heavy as wood from which it is made, charcoal presents some advantage as a fuel, because of lower transportation charges. A good charcoal should be thoroughly burned without being brittle and should show the woody texture distinctly. The fracture should be conchoidal, lustrous and quite black. It should have few cracks, the specific gravity should be high and it should burn slowly without flame or smoke. Charcoal is chiefly used in the manufacture of charcoal iron for which purpose it is specially valuable, because of its low phosphorous and sulphur content. It is also used to some extent as a domestic fuel and as an absorbent and clarifier.

TAR AND OIL.

WOOD TAR:—The crude wood tar produced when wood is distilled in retorts varies from 3 to 10 per cent. of the wood. It is used for preserving wood for making roofing felts, as an antiseptic, and for the preparation of wagon grease and other low grade lubricants. Wood tar is a thick, dark coloured, viscous material, still containing some acetic and other acids and has a specific gravity of about 1.05 to 1.15. It consists when derived from hard wood chiefly of paraffins, toluene, xylene, cresol, phenol and methyl derivatives of pyrogallol. The tars derived from coniferous woods constitute the chief tars of commerce, and are particularly rich in

turpene, contain considerable quantities of rosin and have a much greater commercial value than those derived from hard wood.

WOOD OIL:—When a crude aqueous distillate is first distilled in order to separate acids, alcohols, and acetone from the tar, some of the light oils which are present distill with the acid alcohol and finally remain in the alcohol still, or if distillation is carried further, they pass over in the last stages and separate as an oily layer.

AQUEOUS DISTILLATE OF CRUDE

• PYROLIGNEOUS ACID.

GENERAL TREATMENT FOR THE SEPARATION OF ACETIC ACID AND METHYL ALCOHOL:—This distillate comprising from 30 to 50 per cent. of the weight of the wood, contain as its chief constituents methyl alcohol 4 to 6 per cent. acetic acid 8 to 14 per cent. acetone 2 per cent. and tar held in solution by the acids and alcohol present, the balance being practically all water contained in the wood and resulting from its decomposition. The distillate is a dark red liquid having a strong acid reaction. Its specific gravity varies with the amount of water in the wood and the character of wood used. This crude liquor is used to a limited extent in making pyrolignite of iron or black iron liquor, an impure acetate of iron used in dyeing and calico printing. There are a number of different methods followed for separating the tar from this aqueous distillate and the several valuable constituents of the latter from each other. In practice one of the two following general methods is used in handling the settled liquor:—

1. It is neutralised directly with lime and the alcohol distilled. The resulting calcium acetate is much contaminated with tar and when evaporated and dried at about 125 deg. C forms the commercial 'brown acetate of lime' containing from 65 to 75 per cent. of real acetate of lime the balance being tarry matter, calcium carbonate and water.

2. The crude pyroligneous acid without previous neutralization is dis-

tilled from the tar it contains. This is better practice. Distill the alcohol, acid and other volatile constituents, leaving only tar in the still. Then carefully neutralize this distillate with milk of lime and force it to a still and redistill. Alcohol, aldehyde and acetones pass over, while acetic acid remains in the still in combination with lime. The most perfect separation and highest yields are obtained by this method. The substance

produced by treating the acid solution with milk of lime is known as gray acetate of lime.'

ACETIC ACID:—Commercial acetic acid is produced from gray acetate of lime or from brown acetate previously heated to about 230 deg. C to destroy tarry matter by distilling with concentrated hydrochloric or sulphuric acid. The latter is rarely used, as the calcium sulphate formed is difficult to remove from the stills and the impurities in the acetate reduce the sulphuric to sulphurous acid, which contaminates the acetic acid. A single distillation yields a slightly coloured solution, containing 30 to 50 per cent. of acid which may be further purified by heating with potassium bichromate or permanganate and redistilling. The first portion of

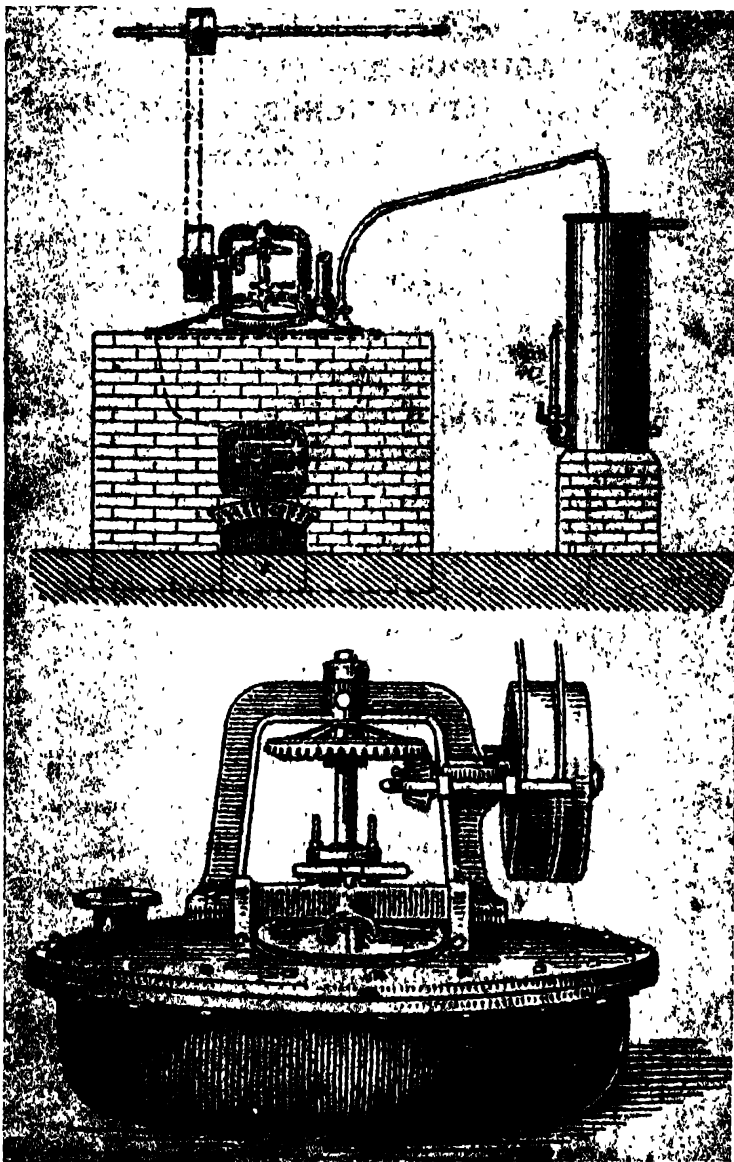


Fig. 4. Still for preparing acetic acid from acetate of lime.

the distillate is contaminated with formic, propionic acids but the subsequent portions are nearly free from impurities.

GLACIAL ACETIC ACID:—Glacial acetic acid is prepared by heating fused sodium acetate with concentrated sulphuric acid in a porcelain lined or earthenware still and then distilling, when a nearly anhydrous product is obtained which crystallises if cooled to 16.5 C.

The ordinary acetic acid of commerce contains about 30 per cent anhydrous acid, has a specific gravity of 1.040 and is slightly coloured. It is used in the preparation of acetate, the manufacture of white lead and in pharmacy. Some pure acetic acid made from wood by distillation is used as vinegar, but such preparations have not the characteristics of fruit vinegar.

In addition to acetate of lime and soda the following acetates are prepared for industrial purposes.

1. Aluminium acetate.
2. Chromium acetate.
3. Copper acetate.
4. Lead acetate.

CRUDE METHYL ALCOHOL AND ACETONE:—The distillate obtained from the acetic acid or calcium acetate in the lime still contains the following:—From 8 to 10 per cent of methyl alcohol, acetone (methyl acetate), some acetic acid and oily hydrocarbons and ketones. It is necessary therefore to remove these impurities which is done by fractional redistillation and repetition of the same.

PURE METHYL ALCOHOL:—As alcohol and acetone form mixtures having

a minimum boiling point, it is impracticable to separate them by simple distillation, and therefore other means are employed. The alcohol is treated with chlorine, which combining with the acetone present forms chloracetones having higher boiling point than methyl alcohol, so it is separated by distillation.

PURE ACETONE:—It is a colourless liquid having a peculiar ethereal odour, and a burning taste, a specific gravity of 0.814. It is miscible with ether, alcohol and water in all proportions. Commercial acetone should not have a specific gravity of 0.802 at 15 deg. C. It is an excellent solvent for resins, gums, camphor, fats, gun cotton, and is largely used in the manufacture of smokeless powder, the preparation of celluloid goods, chloroform, iodoform and sulphonol.

—BY A CHEMIST.

We should all be happy if we didn't try to be happier.

Be not niggardly of what costs thee nothing, as courtesy.

Optimist—one who has cultivated the faculty of thinking in averages.

When a man has more money than brains, the handicap does not last long.

It is better to be chaotically alive than methodically dead.

There are just two reasons for not minding your own business:—(1) you have no business to mind, or (2) you have no mind.

The man whose whole vision is bounded by the walls of his stare will become so narrow that he will not recognise the need of broadening the trade.

INDIAN VILLAGE RECONSTRUCTION.

INTRODUCTORY REVIEW.

THE nation lives in villages. This we admit to be a wise saw—but how many of us do realise the full import of it. And yet a very insignificant portion of the teeming millions of this vast peninsula reside in towns! The material prosperity of India is therefore intimately bound up with the welfare of the villages.

There is no gainsaying the fact that we have neglected the villages ignominiously and left their inhabitants to their sad fate. The villages have become insanitary and desolate: the villagers are suffering from chronic poverty. It is a happy augury, however, that the cry of village reconstruction is in the air and a lead has been given.

CAUSES OF DECAY.

The causes that have worked the decadence of the villages where once peace and prosperity reigned must be first probed so that we may be able to ascertain the remedies. It is needless to point out the extent of the malady as it is not only well-known but also widely felt. To indicate briefly, the causes are:

(1) Constant economic drain and consequent poverty.

(2) Urban orientation and emigration.

(3) Decay of village industries due to competition of foreign merchandise.

(4) False glamour of so-called civilisation.

(5) Ignorance and dissension in the village community.

BACK-TO-THE-VILLAGE.

We must combat the evils one by one to restore back our pristine glory. The primary requisite for village reconstruction is a "back-to-village" movement. A start must be at once made in rural orientation. In order to induce the people who have deserted the village to come back to the habitation of their forefathers and in order to resist those other inhabitants who contemplate desertion to stay on, ample provision must be made for their welfare and happiness.

This back to the land movement has been inaugurated in several countries of the West also where industrialism of the worst type runs rampant. There are associations in England to induce people to go back to villages: efforts are made in America to induce people to go back to country side and take to agriculture on a large scale. In Japan the State is itself concerned in the welfare of the villages. Co-operative systems have been perfected in many part of Europe such as in Holland, Denmark, etc. It is high time that we in India took steps to set to reconstructing our villages and reviving village industries.

URGENCY OF THE PROBLEM.

Rural reconstruction is not only imperative but long overdue. If the traditions, culture and the unique civilisation of India are to be preserved in-

tact the problem cannot be shelved any longer. Our national existence is threatened from all sides and in the interest of self-preservation we must immediately set to the rebuilding of the villages. In chalking out a line for advance in rural reconstruction the different aspects of the question must be examined from as many view points as possible.

The factors to be considered are: -

- (1) Sanitary arrangements.
- (2) Medical relief.
- (3) Congenial occupations.
- (4) Educational facilities.
- (5) Reformed social conditions.
- (6) Pleasant diversions.

We will endeavour in the following pages to formulate a scheme of rural reconstruction incorporating the above salient features. The subject is so vast that it cannot be encompassed in a short note. We will however draw a short outline which can be developed item by

item. We approach our theme with diffidence and depend on words of counsel from our readers.

ORGANISATION AND SERVICE.

The task of rural reconstruction is a gigantic one. It cannot be effected by spasmodic attempts, nor by half-hearted activities on the part of individuals or self-constituted bodies. The purpose can be served only by the united effort of the whole nation in every sphere and phase of its life.

In this supreme hour of need India expects everyone to do his duty. She will claim the proper quota of contribution from educationists, philanthropists, lawyers, medical practitioners, social reformers, industrialists and businessmen. Organisations must be formed everywhere and for every purpose but the guiding principle of all of them should be "Service of the Motherland". To be really useful they must be conducted on

a spirit of self-sacrifice. The members of these organisations must go forth to reconstruct the villages with missionary ardour and preach the gospel of hope to the dejected villagers. To them will devolve the task of making a new nation out of the ruins of old. The work of an association can be carried on successfully only by able and judicious leadership and proper direction.

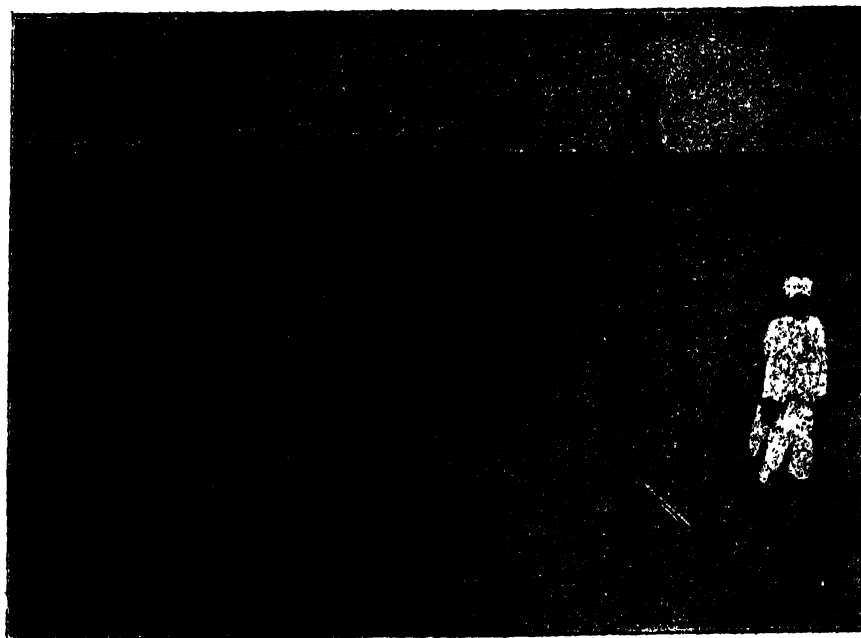


Fig. 1. Ploughs and Harrows.

THE HUMAN ELEMENT.

The first, and it may in truth be said, the main point to consider in connection with the problem of rural reconstruction is the human material that will have to be dealt with. Under both aspects coming into account, alike as making for economic prosperity, and as providing for a sufficiently abundant and prosperous and contented rural population, it is the human folk entering into the problem which have first to be thought of. It is they who can, by their skill and enterprise, make a prosperous agriculture; it is they, once more, who can, as a host of social items, make such a net-work of social communities as will provide a trustworthy formation for happy and contented rural life. A proper human personnel being provided all the rest that is needed will follow of itself. The most conclusive proof of the necessity of rural reconstruction is the paucity of that material, which forms the subject of so many and so frequently repeated complaints.

GENERAL SUGGESTIONS.

Many of the time-honoured institutions which conduced to the growth and prosperity of the village and its community and which have fallen into disuse must be revived. The dedication of temples and mausoleums, excavation of tanks planting of trees on road sides, manumission of bulls, erection of rest houses for the travellers were imbued with spiritual significance but, in result were beneficial to the community. The village parlour was the *rendez vous* of the villagers who flocked there to ex-

change news and views and to discuss current topics of interest. There must be open spaces to serve for play grounds, where the youth may crowd together and indulge in healthy sports. Grazing grounds must also be set apart for the cattle and other stock animals for grazings. One or two tanks should be reserved in every village for drinking purposes. We may also point out that fairs and *melas* of those days took the place of more costly exhibitions of modern times. *Jatras* (country plays), *kathakatas* (rhapsodies by village bards) held in the open were healthy channels of education. On ceremonial occasions the villagers mixed with one another more freely and this led to the growth of unity amongst themselves.

SOCIAL.

On the social side cordiality between the different communities is the most essential desideratum. The aristocracy is bound to look to the welfare of the peasantry who toil hard to swell their coffers. The high should mix with the low and the rich with the poor. The different sects and creeds and castes should live side by side in peace. Unless there be mutual friendship, goodwill and co-operation no good results can be hoped for. The spirit of litigation spells ruin to the villagers engaged in disputes. Amicable settlements must be effected through the good offices of village *panchayats*. Arbitrators and mediators must be impartial.

MALARIA.

Malaria is the most terrible scourge of this country exacting as it does a heavy toll in human lives annually. It

is at once the terror of the peasantry and ruin of the inhabitants, and as such is primarily responsible for the desolation of the villages. In any scheme of rural reconstruction the question of malaria will naturally appear foremost. To fight successfully this devastating demon and to free the country and the people from its clutches, strong, bold and united measures are needed. Of the steps to be taken some are curative and others are preventive. We suggest the following specific measures:

(1) Keeping the habitations and their surroundings clear.

(2) Cleansing the ponds and *nul-lahs*.

(3) Using distilled water for drink and boiled water for bath.

(4) Using mosquito curtains or mosquito preventives.

(5) Culture of swans and ducks and certain species of fish which devour greedily mosquito larvae.

(6) Cultivating sanitary plants around the dwellings and in the court yards, such as, sunflower, eucalyptus, the sacred basil and other pot herbs.

Malaria has been described as a poverty disease and with improved mode of living and better economic condition it will be eradicated together with other diseases.

DISEASES.

The ravages of other fell diseases such as cholera, small pox, influenza, plague and other epidemics are not less distracting. It must be our endeavour to secure immunity from these diseases or otherwise to mitigate the evils wrought

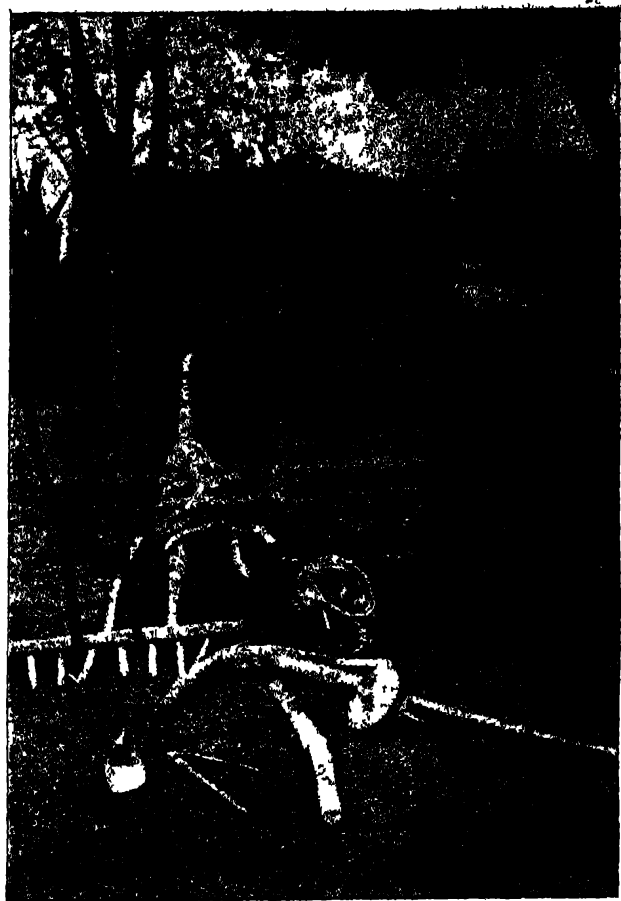


Fig. 2. Agricultural Implements.

by them. The following steps are to be taken with that end in view:

(1) the spread of sanitary knowledge,

(2) the practice of hygienic laws,

(3) the fulfilment of the laws of health,

(4) purity of breathing air and drinking water.

In this connection it should be noted that tube-wells will provide good drinking water and that medical aid must be adequate and easily accessible.

ECONOMICS.

The economic welfare of the people is by far the most serious factor as the welfare in all other spheres is bound up with it. It is needless to point out that

their pecuniary condition is extremely distressing. The middle classes manage to live from hand to mouth with considerable difficulty. Whole of the poorer classes, are constantly faced with starvation. There is dearth of food and dearth of clothes—the prime necessities of man. So it is that famine and disease have made their permanent abode in this unhappy land and the demon of gloom is hovering over the people. Economic stress naturally preys on their health and impaired health necessarily detracts from their work. Unless the lot of the villagers be improved and their economic condition bettered no hope could be entertained as regards permanent welfare. Unrest breeds in this economic distress while a well contented village community is an economic asset. An even distribution of wealth is therefore urgently necessary. According to rudimentary economics the potter must support the carpenter, the goldsmith should support blacksmith and all must support the spinner and weaver.

FINANCIAL.

Rural reconstruction will necessarily involve a great deal of expenditure. A mint of money will be required to carry into effect the various items of work laid down. Prudence dictates, therefore, to enquire into the possible sources of income to meet the expenses. It must be patent to all that for financing this movement we cannot depend on charity or philanthropy. In order to secure the foundation of a national cause we must place it on a sound and permanent basis.

The task of village reconstruction may be lightened only by increasing the

per capita income of the villagers. For it is only when the villagers have enough money to spare that they can be expected to spend something for the improvement of the villages. Rural reconstruction will then be rendered automatic.

We must, therefore, lay great stress on the flow of the wealth to the villages. We must direct all our activities to the production and conservation of wealth. It must be our incumbent duty to increase our national wealth for it is only then that the villages will smile with plenty and prosperity even as the earth is flooded with light at the rise of the sun.

Now wealth can be produced by utilising the natural resources properly and adequately and by engaging in industrial and commercial pursuits. New avenues of employment must be chalked out and all the possibilities of exploitation explored. Wealth can be conserved by using nothing but swadeshi goods and by minimising waste of every kind. Thus by the production and conservation of wealth, national wealth will be increased and beneficial results felt.

We will show, therefore, in detail how cottage industries can be revived, what new industries can be introduced, and what improvements are necessary on the existing ones. We will request our countrymen with all the earnestness we possess to take to agriculture, fishery, industry, manufacture and business in increasing numbers for in that way only lies our salvation. Remember that philanthropy cannot be worked on a national scale and a whole country cannot be converted into a charitable

institution. Unless we are able to stand on our own legs we are doomed to perdition.

PROVINCIAL SURVEY.

BENGAL.

While agriculture occupies over 72 per cent. of the population, the whole of those engaged in the preparation and supply of material substances comes up only to 10 per cent and amongst these handloom cotton weavers, though the most important workers in indigenous workers in precious metals, 04 per cent, workers in precious metals, 04 per cent potters and iron workers each 03 per cent. Hence we see what a small proportion of the population is included under the head of artisans. The comparative importance in the leading handicrafts are as follows:—(1) Weaving (2) Pottery, (3) Carpentry, (4) Mat making, (5) Leather manufacture, (6) Iron manufacture.

What is wanted for the improvement of the individual weaver in Bengal is a cheap adaptation of the fly-shuttle mechanism to the country loom. The problems connected with the industry are many and varied. First, the problem of assisting the weaver in his old individualistic ways is one thing; for that, the cheapest form of mechanism which will give an increased outturn is required. This will give an increased power of production. Secondly, the problem of applying generally human labour to work looms is another. This depends upon whether there is a market for the hand-product, and whether it can compete successfully with the machine product. But even if these conditions are satisfied, this is not enough. Organised capital is required. The capitalist can either finance the weavers in their own homes in an existing weaver colony, and distribute their goods for them; or he can in a similar colony economise by

bringing the weavers and their wives and children to work under one roof.

The following industries are carried on in Bengal —Boat building; Book-binding; Electro-plating; Fishing hooks; Gilding; Masonry work; Musical instruments; Tape-making; Tin-foil; Watch repairing. The handicrafts are:— Wood-



Fig. 3. Paddy Field.



Fig. 4. Rice Husking.

carving; Shell-ornaments; Embroidery and Lace-making; Soft stone carving; Horn-carving; Lac-work; Lace-making; & Toy-making; Wood-engraving; Ornamental glass ware; Clay modelling; Metal-inlaying; Ivory carving; Gold and silver work.

There are prospects for pencils and button, ink, match, soap, brush, etc.

ASSAM.

Industrial enterprise, specially on modern lines is still very much in its infancy amongst the indigenous Assamese. For the lower classes agriculture is, and will in all probability continue to be, the most profitable industry for a long time to come. The sufficiency of agriculture for the Assamese, & existence of vast tracts of fertile lands not only account for the poor and deca-

dent condition of the indigenous industries of Assam, but the labour problem now is, and will continue to be the greatest difficulty in the way of the establishment of new industries in this province. It is sad to note that even the elementary industry of agriculture cannot be considered to be in a very flourishing condition amongst the indigenous inhabitants of the province.

The cotton weaving industry in Assam is in vogue in three distinct stages among the different classes of the people. Among the progressive inhabitants of the Surma Valley the industry may be said to be extinct, and there is little probability of its revival. Among the Assamese proper, weaving still holds an important position, even in the manufacture of the coarser cloths. It will probably be long before these are altogether superseded by imported fabrics, and the weaving of delicately ornamented cloths will, no doubt, long continue to be a favourite pastime for well-to-do ladies. In the hills also and among the hillsmen who have settled in the plains, weaving is still largely practised.

SILK.—Like cotton, silk-weaving is not an industry inasmuch as it is a part of the occupation of every female in the Assam. The remarks about the nature of the cotton-weaving in Assam apply equally to the silk-weaving industry, Silk fabrics are also woven both for home consumption and for sale. The mass of the silk weavers in Assam are in a very depressed condition which and existence of vast tracts of fertile lands not only account for the deca-

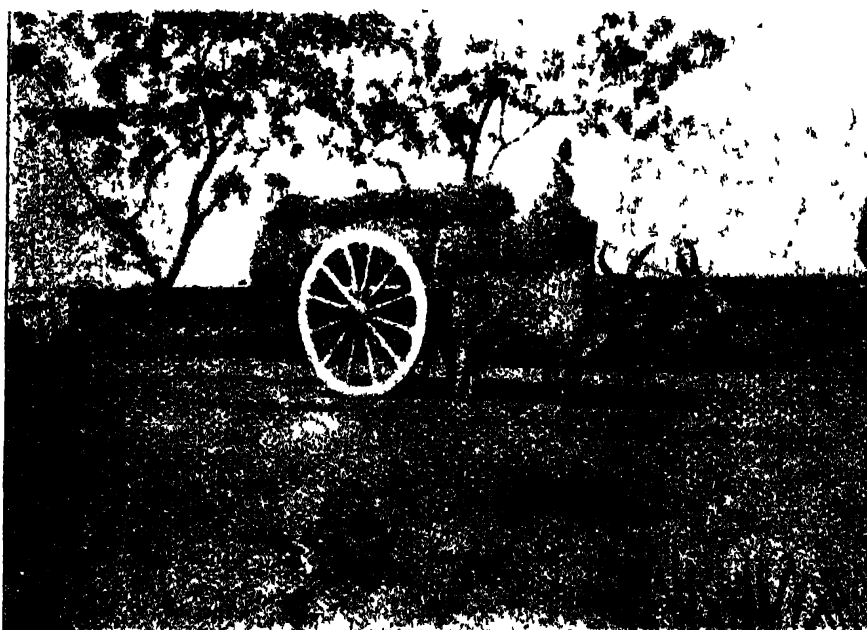


Fig. 5. Cart Transport.

development of the silk industry of Assam, both in raw silk and silk piece-goods than is the case with cotton.

METAL WORK:—Gold and silver, brass, iron work.

TEXTILES:—Blankets; cotton; darri; embroidery; hosiery tasar; calico; gunny bag; silk.

SMALL INDUSTRIES.—Candle; comb; cutlery; musical instruments; toy; perfumery; button; tape; brush.

MISCELLANEOUS.—Dyes and dyeing;

INDUSTRIES:—Glass, hides and leather; oil and flour mill; paper; soap; pottery; saltpetre; glaze tile; corn grinding.

Among the other industries of the province may be mentioned:—

Manufacture of brass and bell-metal industries, shoes, woollen utensils, wood carving, toy making, pottery, fish industry.

Of the industrial arts may be noted jewellery and enamelling, ivory carving, embroidery, lac bangles.

Handicrafts:—Mat and basket making.

Among the mineral industries of Assam are:—

Coal, petroleum, lime, sand lime bricks. Industries in forest products are rubber, lac.

Agricultural industries are sugar, oil seeds, tea, tobacco, rice and wheat.

The fish industry is one of the most important of the indigenous industries of the province of Assam. It is still carried on in the old methods, either by individual fishermen, or by a combination of fishermen, working under a middleman, who takes the lease of a fishery, and supplies the boats and nets necessary for carrying on the business, while the fishermen supply the labour.

This industry is worked in the several forms:—

- (1) Export of fresh and salted fish
- (2) Preparation of dried fish.
- (3) Preparation of fish oil.
- (4) Sale of fish-manure.

The possible byproducts are fish manure, isinglass, fish skin and fins: Preservation of fish may also be tried.

BIHAR AND ORISSA.

The province of Bihar and Orissa is mainly a country of agriculturists. But

although the industrial outlook may appear good the economic state of the people, on the whole, is deplorable as compared with the condition of people in other parts of India. It cannot be denied that in Bihar as also in India as a whole, the population has increased by a larger percentage than the area under cultivation or the production of staple food grains, though the external demand for food-grains has been on the increase. For want of up-to-date methods of agriculture and for want of knowledge of manures, the soil has become impoverished. As the best lands have already been brought under cultivation and the cultivable waste lands are either inferior in quality or situated in unhealthy and inaccessible places, it may be reasonably assumed that there is comparatively little room for the expansion of agriculture in the country either by intensive cultivation or improved irrigation. So long as existing conditions prevail the situation is likely to become acute. It may be fairly stated that, the country is suffering from a low level of industry, a low level of education, a low standard of living and earning, a low capacity for co-operation, and low ideals of aspiration and efforts generally. The only direction in which the earning capacity of the people may be increased is by industrial expansion on the lines followed by the advanced countries of the world.

The following industries are in vogue in Bihar and Orissa:—

PRODUCE:—Ghi, mica, sugar cane, tobacco, indigo, myrobalan, cocoons, fish.

HANDICRAFTS:—Basket making, cane and bamboo chairs, ivory carving, lac work; wood work, stone work, mat weaving.

CENTRAL PROVINCES.

From an industrial point of view the Central Provinces and Berar may be divided into four tracts. The first is the wheat tract of the Nerbedda valley; the next, Berar and the Nagpur country, where cotton is the staple, and the people are, both industrially and agriculturally, more advanced than elsewhere. The third has for its distinctive crop rice, which is grown mainly in the Wainganga valley and in the great plain of Chhattisgarh. The fourth comprises the upland districts in the centre of the province where cultivation is in a comparatively backward state and the resources of the people are scanty; but the country is covered in many places with useful forests and contain valuable minerals.

It is only the second and the last of these whose products naturally lend themselves to industrial development on any considerable scale. Neither wheat nor rice provide work for any one but the farmer or the conveyer. The only industries that these tracts possess are, speaking generally, of an antiquated nature.

The cotton tract, on the other hand, has for its chief product a raw material, the working up of which forms what is almost the chief industry of the world. Although by far the larger portion of the locally produced cotton is exported, enough is worked up locally to give a decidedly industrial bent to the population of such towns as Nagpur, Akola and Burhanpur; and the export and manufacture of cotton have built up a wealthy class of traders and industrialists, that have placed this tract in point of resources very far ahead of any other part of the province, however fertile the

oil. The complete development of the possibilities of the upland tract is not yet in sight, and at present its inhabitants, whose wealth and methods of cultivation are inferior and who are as yet incapable of availing themselves of the natural resources of the country, they live in, are for the most part the poorest in the province.

There is a general consensus of opinion among those best qualified to judge that the weaving industry can be substantially improved in several directions. Cloth is woven in three qualities—coarse, medium and fine. Other notable industries are: Silk, silk bordered, gold and silver lace weaving, tasar industry: Pottery, brick and tile making, and leather industry: Oil press industry, wool industry: Dyeing and calico-printing: Blankets, sheep rearing: brass and copper ware: Tasar and mulberry silk production: Mat and basket: Hosiery, cotton rope and tape making: Toy, and smithy and carpentry.

UNITED PROVINCES.

The industries of U. P. are:—

The cotton industry, the silk industry, the woollen industry, dyeing and calico-printing, fibres and paper, food grains, sugar, tanning and leather, oil and oil seeds, brass and copper, iron, steel and minor metals, stone and building materials; wood-

work and carpentry, pottery, glass, alkalies and chemicals, dairy produce, soaps and perfumes, lac, varnish and paint, tobacco and catechu, gold and silver ware.

Among the so-called minor industries are—Chikan work, embroidered caps, horn combs, bones, peacock feather fans, etc.

OIL SEEDS.—This industry appears to be very important from an economical side. At present oil seeds are exported in such quantities that the cake, which is a great nourisher of soil, is lost to the country. Export of cotton seed has assumed a very large proportion in recent years and if it is not checked good bullocks in Western India will soon disappear for want of the nourishing cotton seed.

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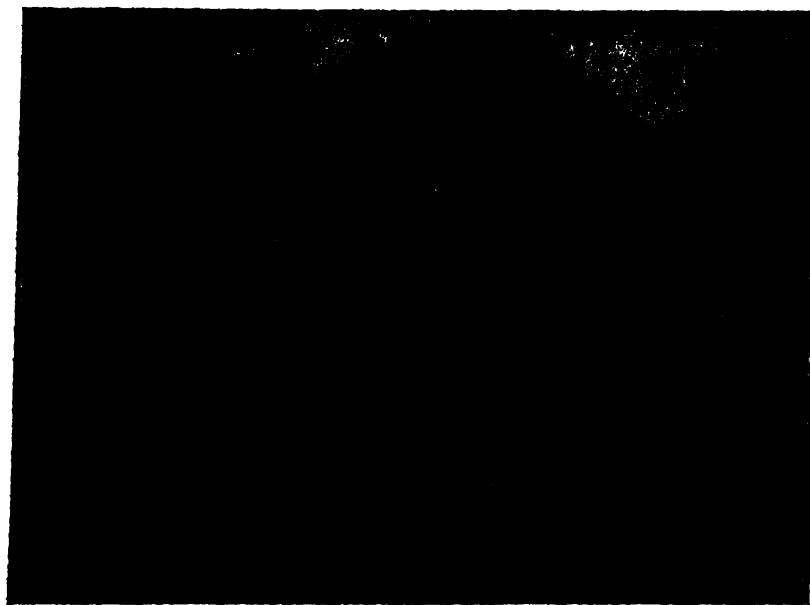


Fig. 6. Oil-Milling.

to indicate the possible lines of development:—

A. OLD—(1) Improvement in existing industries.

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B. NEW—(3) New industries based on agriculture.

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C. UNKNOWN—i.e., industries that may take their rise from some new invention or discovery which can be exploited within the province.

1. The existing industries obviously afford great scope for improvement and deserve first consideration. The chief are weaving, dyeing, tanning, iron work and wood work, and in these much can be done:

(a) by educating the workers in their craft so as to improve their technical skill;

(b) by introducing more capital in the way of improved machinery, implements and materials, and in the provision of more power;

(c) by providing the element of intelligent enterprise so as to enable the workers to use the capital employed to the best profit.

In so far as these industries are developed in villages, it is probable that the labour will be supplied by the existing classes of artisans.

2. Instances of agricultural industries are afforded by oil-pressing, flour milling, cotton ginning, rice hulling,

sugar-cane crushing, wool washing, etc. etc., indeed all stages in the preparation of raw produce for consumption. These processes are at present being carried out in a generally efficient manner. The most promising lines of development appear to be the introduction of more efficient machinery and power and the elimination of waste, and the purification and refinement of articles of export so as to raise the value in proportion to the bulk.

3. The class comprising new industries based on agriculture appears to promise the most hopeful results as the scope for introduction is very wide. The industries that seem to deserve early investigation are sericulture and silk; fruit and fruit preserving, canning and drying vegetable dried and desiccated; bees and honey; dairy, poultry, etc.

All these industries seem to be within the capacity of the agricultural classes, provided they can be supplied with intelligent guidance.

4. New industries not based on agriculture.

Examples of this class are agricultural implements; petroleum and its derivatives, cement making, glass making, salt mining, iron, coal, gold washing, utilisation of forest products such as turpentine.

5. Unknown industries are such as chemical manures, etc.

MADRAS.

The industrial development of the Madras Presidency must mainly depend upon the improvement of its agriculture by extending irrigation. This is a

matter of vital importance. The forests of the Presidency might in the future supply enormous quantities of extremely valuable fuel and for that reason manufacture of charcoal and utilisation of all the bye-products is the preliminary step.

The following industries must be developed:—

- (1) Metal work,
- (2) Sugar cane and manufacture of sugar,
- (3) Production of industrial alcohol,
- (4) Extraction of oil from seeds,
- (5) Manufacture of lead pencils, matches, and glass, .
- (6) Exploitation of forest produce,
- (7) Establishment of chemical industries,
- (8) Manufacture of leather,
- (9) Establishment of dye-works,
- (10) Manufacture of coir and the extraction of other fibres.
- (11) Manufacture of coal-tar, etc.

The following are the chief industries of Madras:—

Aluminium industry, brick and tile-making, cement works, coffee curing, coir making, cotton, dyeing, glass, jute, leather, manures, metals and precious stones, mines and mine-

rals, oil and oil seeds, paper, pottery, rice, silk, sugar, sulphuric acid, tobacco, wood and timber and wool.

The handicrafts are—Weaving, embroidery and lace-making, gold and silver thread, essential oil, palm sugar, carpentry, carpet weaving, wood carving and boat building, blankets.

MALABAR.

Malabar is so usually spoken of as a land flowing with milk and honey that the impression is apt to be formed that the people there are in no need of special assistance in finding new means of livelihood. But contrary is the fact. The remedies to be suggested for economic prosperity are not easy to find. However there is a fortune in the fish trade: industries in fish oil, fish manure are paying. The crops valuable to these parts are, arecanut, pepper, coconut, ginger, arrowroot, tapioca, plantain, etc.



Fig. 7. Sugarcane-Pressing

FOOD AND CLOTHES.

AGRICULTURE.

Agriculture is pre-eminently the primary industry in India in as much as nearly 80 per cent. of our population are dependent on it for their livelihood. It is also, so to speak, the oldest art in India and yet it is still in a very primitive stage. It well may be called the back bone of Indian industries. If therefore we wish to see the country take its place amongst the civilized countries of the world we should try our best to see that suitable improvements in the methods of cultivation are introduced and that the condition of the agriculturist is thereby bettered.

Our principal agricultural industries—rice, wheat, cotton, sugar cane, jute, oil seeds etc.—are in the hands of men who are small owners and with whom for ordinary purposes a superficial knowledge of certain natural laws and an empiric knowledge of sowing, harvesting, etc., proves sufficient, allowing the rest to be done by such forces of nature as rain, sunshine and air unharnessed to serve the best purposes. The ownership of small holdings by our farmers—so small that they do not always produce crop for their own support—proves their poverty and consequent incapacity to carry on problematic experiments or invest in costlier implements. As a result the farmer is bound to grow his crop only by the antiquated methods followed by his forefathers and therefore incapable of getting the best value for the money, time and trouble expended by him on his field.

The essential equipment for a farmer to be successful under modern conditions are:

- (1) Selection of land and crop suiting each other,
- (2) Scientific knowledge of soil, manure crop, etc.
- (3) Purity and freshness of seeds.
- (4) Labour supply and labour saving appliances. The scarcity of labours is being seriously felt for agricultural operations.
- (5) Irrigation facilities: Construction of *bunds* or dams, canals, etc.
- (6) Improvement of seeds, introduction of new crops, suitable rotation of crops, etc.

If Indian agriculture is to be brought into the line of modern improvements so that we can produce more goods with less labour these essential points must not be overlooked. The main reasons why our agriculture is pursuing the same line of operation for ages are the ignorance and poverty of the ryots.

To organise our agricultural industries the main things necessary are:

- (1) The organisation of small capitals of small holders.
- (2) Co-operation of small holders into agricultural partnerships.

We have been content to leave our agricultural industries with the poorest and most ignorant classes of the country, while our rich men or even the middle classes who should inaugurate improvement and regeneration are generally indifferent towards this staple industry.

institution. Unless we are able to stand on our own legs we are doomed to perdition.

PROVINCIAL SURVEY.

BENGAL.

While agriculture occupies over 72 per cent. of the population, the whole of those engaged in the preparation and supply of material substances, comes up only to 10 per cent. and amongst these handloom cotton weavers, though the most important workers in indigenous workers in precious metals, 0.4 per cent., workers in precious metals, 0.4 per cent. potters and iron workers each 0.3 per cent. Hence we see what a small proportion of the population is included under the head of artisans. The comparative importance in the leading handicrafts are as follows:—(1) Weaving, (2) Pottery, (3) Carpentry, (4) Mat-making, (5) Leather manufacture, (6) Iron manufacture.

What is wanted for the improvement of the individual weaver in Bengal is a cheap adaptation of the fly-shuttle mechanism to the country loom. The problems connected with the industry are many and varied. First, the problem of assisting the weaver in his old individualistic ways is one thing; for that, the cheapest form of mechanism which will give an increased outturn is required. This will give an increased power of production. Secondly, the problem of applying generally human labour to work looms is another. This depends upon whether there is a market for the hand-product, and whether it can compete successfully with the machine product. But even if these conditions are satisfied, this is not enough. Organised capital is required. The capitalist can either finance the weavers in their own homes in an existing weaver colony, and distribute their goods for them; or he can in a similar colony economise by

bringing the weavers and their wives and children to work under one roof.

The following industries are carried on in Bengal:—Boat building; Book-binding; Electro-plating; Fishing hooks; Gilding; Masonry work; Musical instruments; Tape-making; Tin-foil; Watch repairing. The handicrafts are:— Wood-

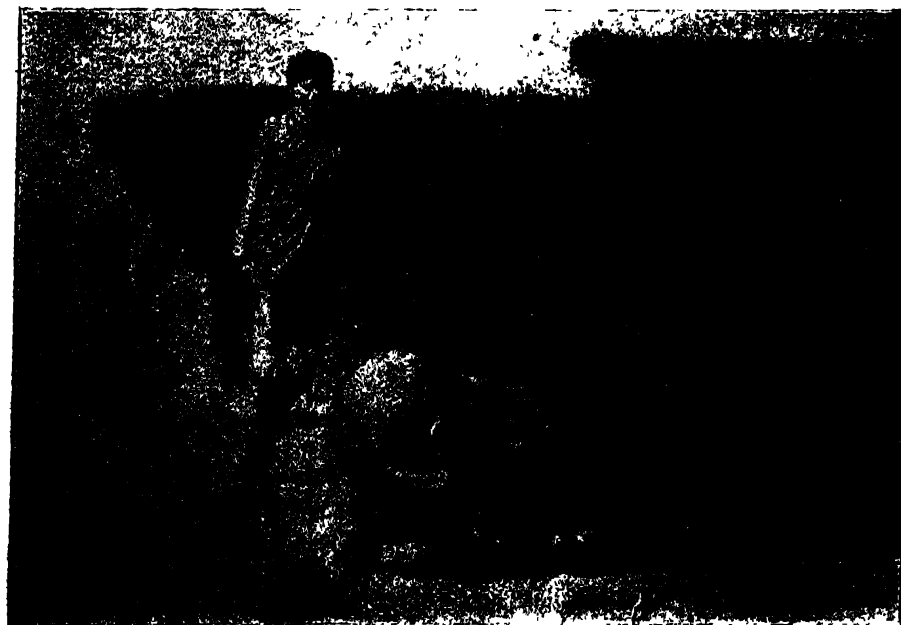


Fig. 3. Paddy Field.

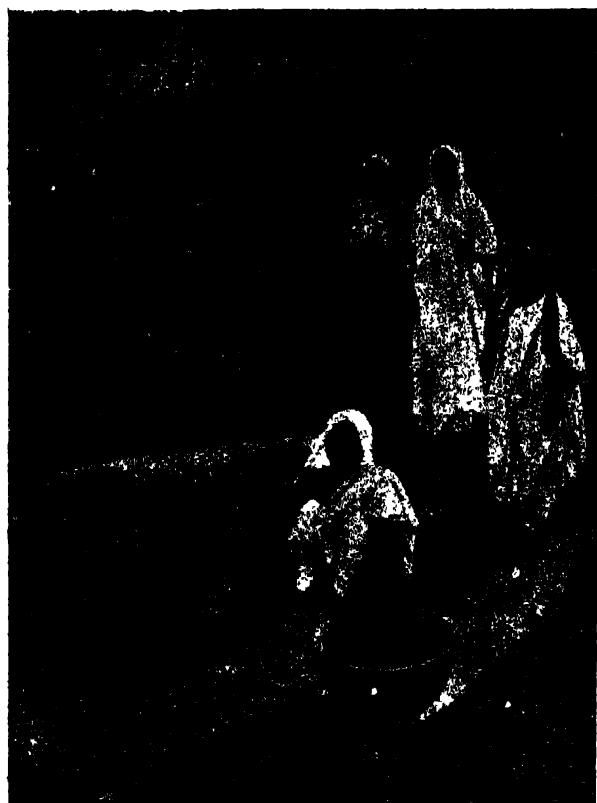


Fig. 4. Rice Husking.

carving; Shell-ornaments; Embroidery and Lace-making; Soft stone carving; Horn-carving; Lac-work; Lace-making; & Toy-making; Wood-engraving; Ornamental glass ware; Clay modelling; Metal-inlaying; Ivory carving; Gold and silver work.

There are prospects for pencils and button, ink, match, soap, brush, etc.

ASSAM.

Industrial enterprise, specially on modern lines is still very much in its infancy amongst the indigenous Assamese. For the lower classes agriculture is, and will in all probability continue to be, the most profitable industry for a long time to come. The sufficiency of agriculture for the Assamese, & existence of vast tracts of fertile lands not only account for the poor and deca-

dent condition of the indigenous industries of Assam, but the labour problem now is, and will continue to be the greatest difficulty in the way of the establishment of new industries in this province. It is sad to note that even the elementary industry of agriculture cannot be considered to be in a very flourishing condition amongst the indigenous inhabitants of the province.

The cotton weaving industry in Assam is in vogue in three distinct stages among the different classes of the people. Among the progressive inhabitants of the Surma Valley the industry may be said to be extinct, and there is little probability of its revival. Among the Assamese proper, weaving still holds an important position, even in the manufacture of the coarser cloths. It will probably be long before these are altogether superseded by imported fabrics, and the weaving of delicately ornamented cloths will, no doubt, long continue to be a favourite pastime for well-to-do ladies. In the hills also and among the hillsmen who have settled in the plains, weaving is still largely practised.

SILK.—Like cotton, silk-weaving is not an industry inasmuch as it is a part of the occupation of every female in the Assam. The remarks about the nature of the cotton-weaving in Assam apply equally to the silk-weaving industry, Silk fabrics are also woven both for home consumption and for sale. The mass of the silk weavers in Assam are in a very depressed condition which and existence of vast tracts of fertile lands not only account for the deca-

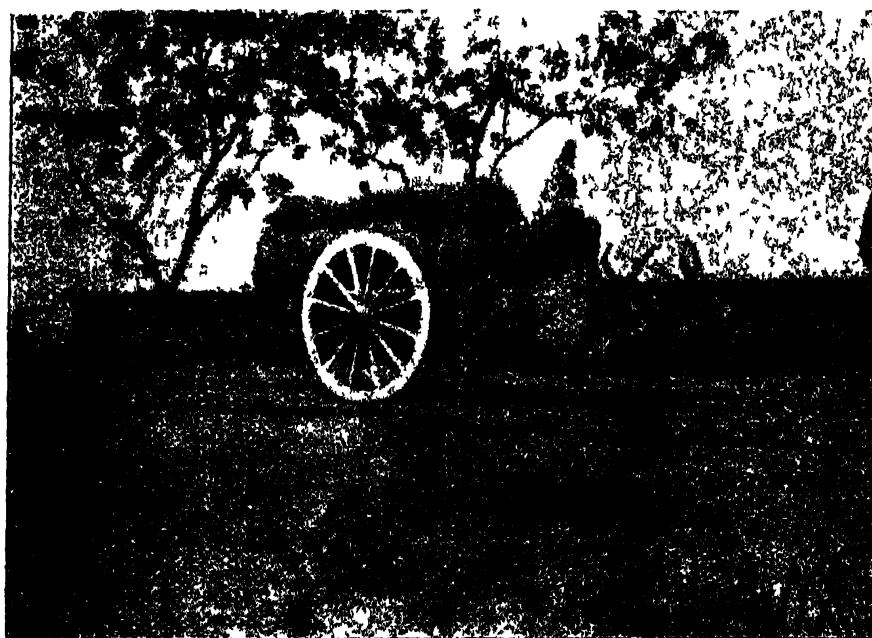


Fig. 5. Cart Transport

lopment of the silk industry of Assam, both in raw silk and silk piece-goods than is the case with cotton.

METAL WORK:—Gold and silver, brass, iron work.

TEXTILES:—Blankets; cotton; darri; embroidery; hosiery tasar; calico; gunny bag; silk.

SMALL INDUSTRIES:—Candle; comb; cutlery; musical instruments; toy; perfumery; button; tape; brush.

MISCELLANEOUS.—Dyes and dyeing.

INDUSTRIES:—Glass; hides and leather; oil and flour mill; paper; soap; pottery; saltpetre; glaze tile; corn grinding.

Among the other industries of the province may be mentioned:—

Manufacture of brass and bell-metal industries, shoes, woollen utensils, wood carving, toy making, pottery, fish industry.*

Of the industrial arts may be noted jewellery and enamelling, ivory carving, embroidery, lac bangles.

Handicrafts:—Mat and basket making.

Among the mineral industries of Assam are:—

Coal, petroleum, lime, sand lime bricks. Industries in forest products are rubber, lac.

Agricultural industries are sugar, oil seeds, tea, tobacco, rice and wheat.

The fish industry is one of the most important of the indigenous industries of the province of Assam. It is still carried on in the old methods, either by individual fishermen, or by a combination of fishermen, working under a middleman, who takes the lease of a fishery, and supplies the boats and nets necessary for carrying on the business, while the fishermen supply the labour.

This industry is worked in the several forms:—

- (1) Export of fresh and salted fish.
- (2) Preparation of dried fish.
- (3) Preparation of fish oil.
- (4) Sale of fish-manure.

The possible byproducts are fish manure, isinglass, fish skin and fins: Preservation of fish may also be tried.

BIHAR AND ORISSA.

The province of Bihar and Orissa is mainly a country of agriculturists. But

although the industrial outlook may appear good the economic state of the people, on the whole, is deplorable as compared with the condition of people in other parts of India. It cannot be denied that in Bihar as also in India as a whole, the population has increased by a larger percentage than the area under cultivation or the production of staple food grains, though the external demand for food-grains has been on the increase. For want of up-to-date methods of agriculture and for want of knowledge of manures, the soil has become impoverished. As the best lands have already been brought under cultivation and the cultivable waste lands are either inferior in quality or situated in unhealthy and inaccessible places, it may be reasonably assumed that there is comparatively little room for the expansion of agriculture in the country either by intensive cultivation or improved irrigation. So long as existing conditions prevail the situation is likely to become acute. It may be fairly stated that, the country is suffering from a low level of industry, a low level of education, a low standard of living and earning, a low capacity for co-operation, and low ideals of aspiration and efforts generally. The only direction in which the earning capacity of the people may be increased is by industrial expansion on the lines followed by the advanced countries of the world.

The following industries are in vogue in Bihar and Orissa:—

PRODUCE:—Ghi, mica, sugar cane, tobacco, indigo, myrobalan, cocoons, fish.

HANDICRAFTS:—Basket making, cane and bamboo chairs, ivory carving, lac work; wood work, stone work, mat weaving.

CENTRAL PROVINCES.

From an industrial point of view the Central Provinces and Berar may be divided into four tracts. The first is the wheat tract of the Nerbedda valley; the next, Berar and the Nagpur country, where cotton is the staple, and the people are, both industrially and agriculturally, more advanced than elsewhere. The third has for its distinctive crop rice, which is grown mainly in the Wainganga valley and in the great plain of Chhattisgarh. The fourth comprises the upland districts in the centre of the province where cultivation is in a comparatively backward state and the resources of the people are scanty; but the country is covered in many places with useful forests and contain valuable minerals.

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The industries of U. P. are:—

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Fig. 6. Oil-Milling.

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- (10) Manufacture of coir and the extraction of other fibres.
- (11) Manufacture of coal-tar, etc.

The following are the chief industries of Madras:—

Aluminium industry, brick and tile-making, cement works, coffee curing, coir making, cotton, dyeing, glass, jute, leather, manures, metals and precious stones, mines and mine-

rals, oil and oil seeds, paper, pottery, rice, silk, sugar, sulphuric acid, tobacco, wood and timber and wool.

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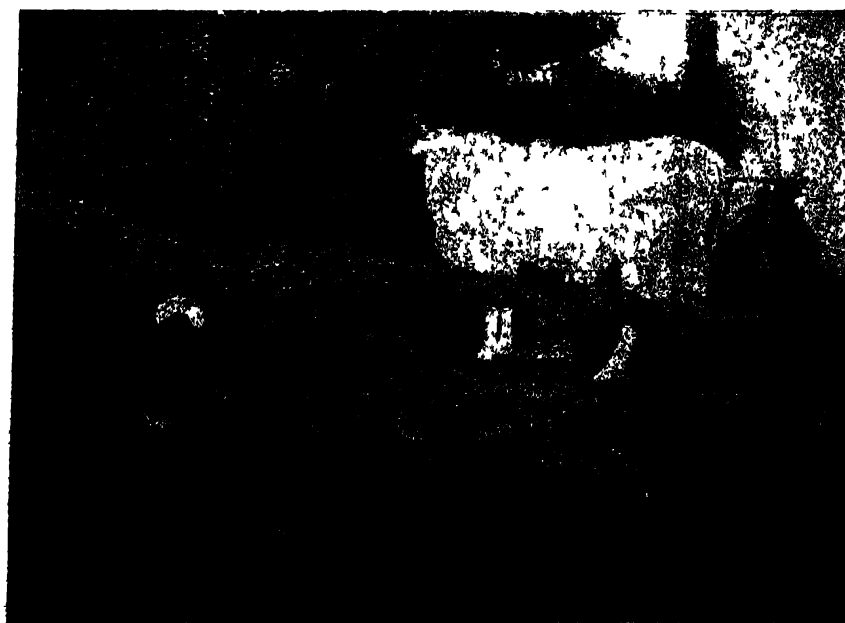


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We have been content to leave our agricultural industries with the poorest and most ignorant classes of the country, while our rich men or even the middle classes who should inaugurate improvement and regeneration are generally indifferent towards this staple industry.

SPINNING.

We cannot lay too much emphasis on spinning as a home industry. Indeed we have advocated the cult of the charka times without number. The reasons for its re-introduction in every home of India will bear repetition. Spinning is the only industry which can be universalised. It is the only industry which can be taken up supplementary to agriculture. The charka can be worked by the womenfolk at home and by others in their leisure. The appliance is at once cheap, simple, easily constructed and repaired.

The greatest economic drain is effected by the import of clothes to the tune of crores of rupees and we have to depend on outside for one of the prime necessities of our life. We must therefore take to spinning inasmuch as it is the basis of textile industry.

Of all the village industries of India most of which are dying spinning has totally disappeared. This is the special reason why spinning should be at once revived. This will certainly add to the meagre income of the cultivators.

Lastly the spinning wheel is the symbol of cottage industries and therefore deserve an honourable place in any scheme for village improvement.

WEAVING.

The question of the improvements of the cotton industry of India is not necessarily synonymous with the improvement of the hand-loom industry. The controversy that has been carried on between the supporters of the hand-loom cottage industry and the advocates of the powerloom factories appear more or less academic. But even under the existing industrial conditions of the country, there can be very little doubt that the claims of the hand-loom industry cannot be neglected.

There are reasons for holding that the hand-loom industry has a special vitality in India. It has been shown that the industry has all the advantages of a cottage industry, it can be combined with agriculture, the plant is inexpensive, the hand-looms are specially suited for the production of durable coarse cloth, for which there is such a large demand in

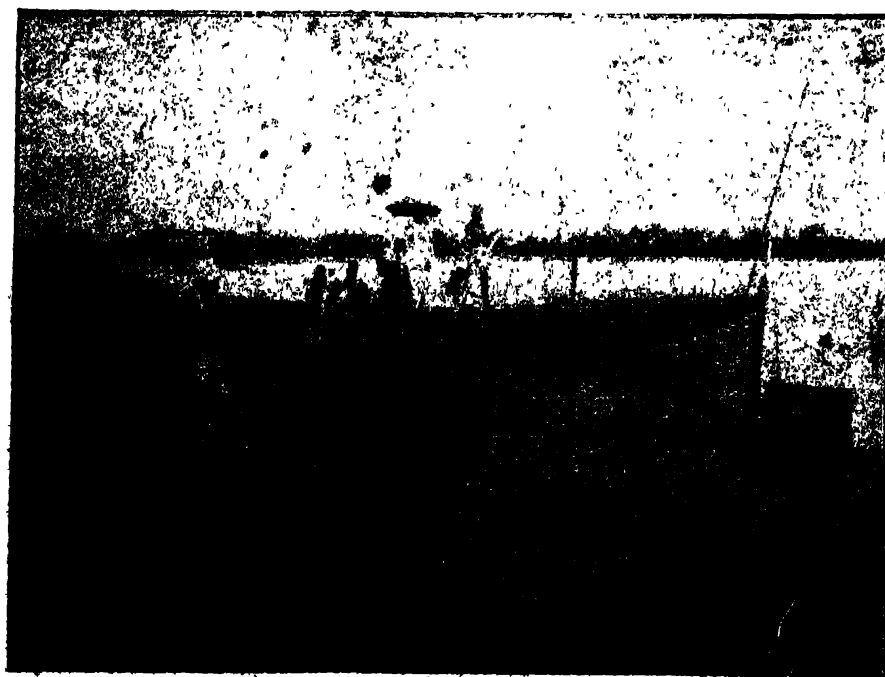


Fig. 8. Fishing in River

India; and finally the weavers have a low standard of living and are satisfied with comparatively low wages, and therefore labour is cheaper.

An improvement in this industry is likely to follow:—

(1) An increase in the demand for the products of the industry.

(2) Improvements in the methods of production, resulting in an improvement in the quality of goods or in the cheapening of their price.

(3) Relief of the industry from its present artificial condition, by a more equitable adjustment of the shares of labour and capital in the profits of the industry.

The improvement of the hand-loom industry is most urgent. Demonstrations held from time to time in various parts of India have established beyond doubt that with the use of fly-shuttle looms Indian weavers could increase their production by at least 50 per cent. The fly-shuttle frame looms are open to objection because of their heavy cost; pit looms with fly-shuttle arrangements are likely to be popular owing to their not heavy cost.

As regards improvements in the mechanical processes of weaving, it seems to be generally admitted that such improvements will be of very little use without a corresponding progress being made in the methods of the preliminary processes of sizing and warping. Properly sized yarn improves the durability of the cloth, a well-laid and well-sized warp makes quick weaving much easier. Besides, under the existing condition of the industry, unless

the weavers' family can learn a quicker method of getting through the preliminary processes, it will hardly be of much use to the weaver to learn to weave much faster than he does now.

As regards improvements in the mechanical process of weaving itself, it is clear that in order to successfully supplant the indigenous pit loom, the new loom must satisfy the following requirements:—

(1) Be able to show quite a substantial increase in the daily outturn over the outturn of the present pit looms.

(2) Be cheap and within the means of the ordinary weaver.

(3) The mechanism must be simple and such as could be repaired by the weaver himself or by the village carpenter.

(4) The mechanism must be light and adaptable to the physique of the ordinary weaver.

(5) The mechanism must be such as to enable the weaver to keep perfect control over the different primary action of weaving. Breakages of the warp must be as few as possible and as easily repairable when they occur.

(6) It should be also adaptable to different kinds of weaving now practised by the hand-loom weaver. A change of shuttle for changing the weft should be as easy and quick, as is the case now.

The following factors may be cited in favour of the handloom:—

(1) The hand weaver's plant represents a small capital and can be kept in use for many years.

(2) The nature and amount of labour requisite for the great variety of design in the more artistic and elaborate garments precludes machine competition in such articles.

(3) The strength and durability of the coarser hand-loom articles recommend them to the cultivator for rough use.

(4) The hand weaver has a low standard of substance, and has also considerable advantage through his inherited skill in the weaving of the finer articles

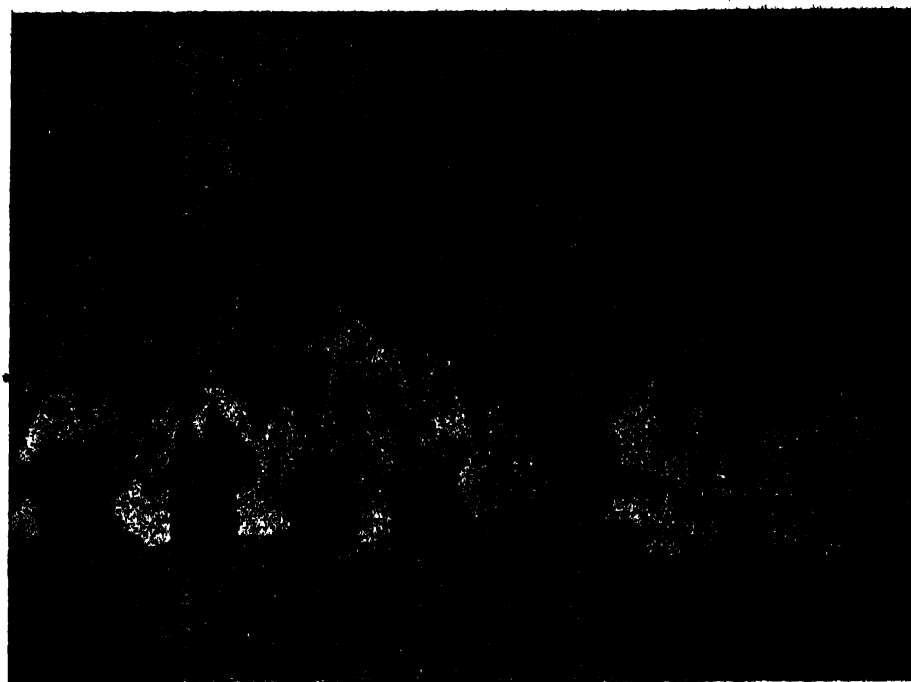


Fig. 9. Silver and Goldsmith.

has been made on these lines has met with success.

ENCOURAGEMENT TO INDIAN INDUSTRIES.

The proposals have been made for—

(1) The stimulation of indigenous industries by the preparation or purchase of materials of public work in India.

(2) It is advisable to improve the technical instruction by the concentration of thought and expenditure on the central institutions.

(3) Encouragement should continue to be given to district exhibitions of industries and industrial arts. Fairs and melas will for some time to come to take the place of other forms of advertisement.

(4) Industrial arts can be effectively encouraged by a ready sale of the best articles, which arises principally from advertisement and publicity.

INDIGENOUS INDUSTRIES.

Our attention should be concentrated on the decaying indigenous industries: hand-weaving, working in metals, tanning and leather manufactures, on all the petty industries which supply the simple needs of the people. Labour must be trained to work more efficiently, the primitive tools of the artisan must be superseded by better implements; subdivision of labour must be introduced and from the crude simplicity of each family at a unit of productive effort strong combination must be evolved, either by co-operative working or by the concentration of manufacture in small factories. That this can be done there is not the least reason for doubt. Every well-directed effort that

(5) It is advisable that the Government should disseminate more freely among the public the information which is obtained so laboriously by its officers.

MANUFACTURING POSSIBILITIES.

India imports numerous articles of every day use from Britain, U. S. A., Japan, Germany and other countries, such as paper, cutlery, glassware, matches, sugar and leather goods, umbrellas, and soaps, candles, and cigarettes and a host of others. Could we manufacture these articles in our country what a large addition should we make to the income of our people and how should we promote prosperity. The idea is an old one, the dream of our sleeping and waking hours, only there is a fresh opportunity afforded now to translate the fancy into a fact. While we have been making during the past twenty years, very gratifying progress in the manufacture of cotton and jute, in the working of coal and gold mines, in tea plantation and in the kerosine industry, we have been marking time as regards sugar refining, oil pressing, iron mining, paper making, wool and silk manufacturing, and in the matter of glass, leather, umbrellas, metal manufactures, stationery, carriages, etc., we are almost no where.

APPRENTICE TRAINING.

The Indian child learns his hereditary craft from his father or is apprenticed to a master craftsman who is always of fellow casteman and often a relative of the pupil. The child picks up his knowledge by watching the workmen at their tasks and soon learns to handle the tools well; next he begins to earn

a low wage from his master, and this is increased with his growth in age and skill, till his training is complete. This system of apprenticeship was an excellent means of technical education in old days and still prevails among the Indian carpenters, shoe makers, etc. It is very cheap, as the master's workshop is in the same quarter of the town as the boy's home, and he can quickly come to his own house for his daily meals. But the indigenous master's teaching merely reproduces his old fashioned knowledge and does not lend towards progress. Since, foreign imports have rapidly increased and supplanted the products of Indian hand industries and the quality of the impoverished Indian craftsmen is quickly deteriorating.

ART INDUSTRIES.

The artistic industries of India are not supported as they ought to be. Much of the patronage whereby some of the arts have been kept alive is from the Europeans though latterly they are receiving the favour of Indians who formerly preferred foreign goods. Indigenous artistic industries at present suffer from want of patronage and want of publicity; and any real encouragement must consist in providing publicity and ready sale for the articles of the best type.

AGRICULTURAL INDUSTRIES.

Allied with agriculture are dairying and animal husbandry, fishery, apiculture, orcharding, etc., which are no less important. These industries if pursued on improved lines will be found extremely profitable. Of jute and tea we need not say much as they are suffi-

ciently organised industries. As regards lac-cultivation and sericulture there is undoubtedly ample scope for expansion.

The area under sugar-cane can be increased considerably as the sugar production of India falls short of consumption.

Sugar can be manufactured in the villages on a small scale with the help of hydro-extractors. The product will be somewhat brownish but pure and sweeter than the less sweet white sugar refined by bone charcoal. Then there is the opening for the manufacture of palmyra sugar on a large scale. In the South palmyra cuts are run to waste over large areas.

By introducing better varieties of tobacco a big industry in cigar, cigarette snuff, pipe tobacco, etc., can be built up.



Fig. 10. Village Blacksmith.

Many of the village raw materials can be made into useful products, such as indigenous dyes, canning of fruits grown in abundance, dried mango pulp, papain from papaw, tinctures and extracts from drugs, and the like. These are suggestions at random, an exhaustive list can be prepared only by the villagers themselves.

TEXTILE INDUSTRY.

This industry affects a large portion of the population next only to agriculture and is in the most languishing condition. As a cottage industry it gives work to millions who suffer most in times of famine and in times of plenty eke out a very poor living. Of late this subject is receiving the attention of both the Government and the people and the cause of the spinning and weaving industry has been greatly advanced.

DYEING AND CALICO PRINTING.

Of late the industry of dyeing has been decaying. Lines of development for the calico printing industry are:

- (1) The introduction of newer and better designs.
- (2) Placing the producer in more direct touch with the consumer.
- (3) Co-operative production.
- (4) The establishment of small private factories by educated men possessed of adequate technical knowledge.
- (5) Improvement in the mechanical process of printing.
- (6) Improvements in dyeing methods.

An improvement in dyeing methods would give a powerful impulse to the industry of calico printing. It will also

be of very great benefit in the cognate trades of silk and wool dyeing. Without the introduction of up-to-date dyeing methods neither hand-loom nor power-loom will be able to compete with the coloured fabrics of Europe.

CARPET WEAVING.

The following suggestions are made for the improvement of carpet weaving: —

(1) There should be show rooms at central places.

(2) Only the best materials should be used.

(3) Scholarships should be given for the study of superior methods.

(4) Only indigenous dyes should be used.

(5) Local enterprise should start factories, utilising men trained in jails.

(6) The best jail methods should be employed.

(7) Advertisements and encouragements should be given at the local fairs.

HOSIERY.

Knitting is an industry allied to weaving. The middle classes of the urban population have taken extensively to the use of cotton hosiery the use of which is continually increasing. The manufacture of cotton socks and under-vests should be started as home industry. It will provide employment for *pardah* women. Some women earn a precarious livelihood by hand spinning and embroidery work.

CARPENTRY.

The chief faults of the village carpenter are his neglect of accurate measurement, his carelessness with regard to the efficiency of his tools, and

his lack of perception of the value of time as a factor in the execution of work. The carpenter's saw is in such a bad order that he cuts tenons as a rule with a mallet and chisel, and his ignorance of gauges renders him unable to make even twenty articles exactly alike; also the carpenter rarely knows what size of nail or screw is required on a given job. The carpenter has to be taught to measure accurately, to use sharp tools, and to cut to the mark. In this respect we can derive lessons from the work of the Chinese worker. The village carpenter, catering for the ordinary agriculturist, is very often an agriculturist himself, who owns some tools, perhaps a saw and a chisel, and turns out-doors, cartwheels, agricultural implements, such as ploughs, *dhenkis* for husking, *ghanies* for the oil-mill, and the weavers' looms, etc. The town carpenter, however, makes a different class of articles:

(1) Articles of furniture.

(2) House materials, doors, windows, etc.

(3) Woodwork.

There is a great opening for carpentry for youths of the middle class.

SUGAR MANUFACTURE.

The indigenous methods of growing cane and refining sugar are capable of considerable improvement. The processes employed for the extraction of juice are wasteful in many ways. The following lines of development may be suggested:—

(1) Improvements in the methods and processes of cultivation.

(2) Improved cane-crushing mills.

- (3) Improved iron mills.
- (4) Improvements in gur-making.
- (5) The adoption of Mr. Hadi's processes for the manufacture of *khanda* and refined sugar from cane juice.
- (6) Construction of power factories consuming gur.
- (7) The establishment of factories consuming cane instead of gur.

LEATHER TANNING.

The chief defects in the present processes of the indigenous leather tanning industry are:

- (1) over-liming.
- (2) antiquated tools for fleshing and removing the hair.
- (3) insufficient attention of men to baling.
- (4) the actual tanning period is too short and the process is not properly graduated.
- (5) very little attempt at currying.

The existing processes, besides turning out very inferior leather involve great waste of lime, bark and labour, chiefly because the operations are on a small scale. The principal obstacle towards improvement is want of capital. The country tanners belong to the poorest and most improvident castes. A judicious encouragement of the tanning and leather industries would afford employment to a very large number of Chamars and poorer Musalmans, without the absolute necessity of removing them from villages to congested areas in towns. The lines of improvement suggested are:—

- (1) Small tanning schools to demonstrate improved methods in suitable localities where the supply of hides is large.
- (2) Attempts to foster the spirit of co-operation among Chamars and Musalman tanners.

(3) Small schools to teach boot and shoe making and the manufacture of saddlery and harness with modern tools and appliances.

(4) Small private capitalists should establish factories on a moderate scale—
(a) for tanning, (b) manufacturing leather goods.

(5) Introduction of chrome-tanning processes.

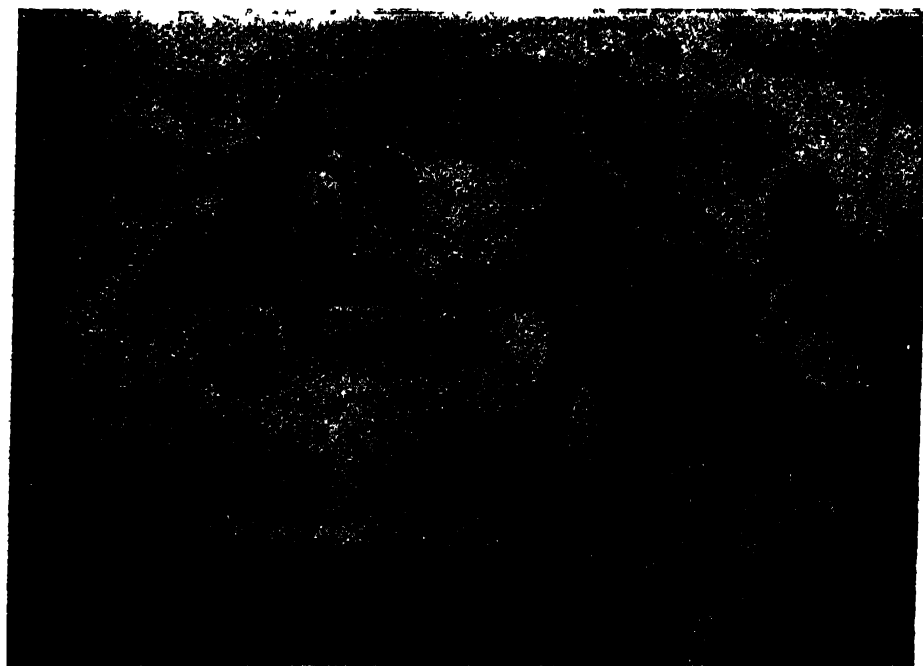


Fig. 11. Tanner and Cobbler.

TANNING AND TANNERS.

Where tanners live in a small community, as is not infrequently the case, some element of co-operation could be introduced. Common vats, decently constructed, one or two drums for revolving by hand, and other similar appliances, might in such cases be found possible.

There seems a strong case for supporting the village tanning trade which has been hard hit by the rise in prices. Its methods are inferior; but considering the poorness of the leather, the manufactured product, or country shoe, is well made and of excellent wearing quality. If then, shoes were made of better tanned material, they would answer all requirements. Some increase in price would be necessitated by the new process.

The leather industry consists in (1) the export of hides and skins; (2) the curing and tanning of leather; (3) the manufacture of boots, shoes, and other articles. The requisites of small tanning factories are: (1) a hide market; (2) a supply of the raw material for tanning; (3) good water; (4) a cheap supply of labour and (5) local colony of *chamars* or *muchis*.

DOMESTIC UTENSILS.

Suggestions for improvements in the manufacture of domestic utensils:—

(1) the adoption of modern tools and appliances.

(2) works on a large scale utilising machinery and steam power.

(3) Co-operation among the artisans.

(4) Manufacture of new styles of articles.

GLASS BANGLE.

The furnace of the bangle maker will admit of many improvements at a perhaps inconsiderable cost. Wood fuel is at present used in all bangle making furnaces but they should be modified as to be able to burn coal. Some modifications may be made for the regulation of air to produce a higher temperature to the bangle maker's furnace thus permitting the use of glass of high melting point which is as a rule cheaper than readily fusible glass. The proper regulation of air may lead to an economy in the consumption of fuel. There is also a considerable strain imposed on the efficiency of the furnaces by the present system of work.

POTTERY.

The two points where the pottery industry seems in need of assistance are (1) some form of mixing or pugging machine, to make a better mixed and finer clay; (2) an improved kiln to consume less firewood, give more certain results, and not spoil so many pots.

STONE CARVING.

The almost total extinction of the art of stone carving is due to (1) the exclusive use of European styles in public building; (2) the neglect of the study of Indian architecture in Indian Colleges of Engineering, (3) the want of discrimination in public taste.

METAL-WARE.

The following suggestions may be made regarding the improvement of metal-ware industry.

(1) The use of dies for stamping the goods to the required shape. The dies are to be stamped with a hydraulic press.

(2) The introduction of better hand-lathes for polishing and filing brass articles.

(3) The introduction of punching machines to save the trouble of cutting with scissors.

(4) The introduction of better and more permanent plate moulds.

BRASSWARE.

Existing processes of brassware manufacture are costly, and a great saving of hand labour might be effected by machinery. There is room for improvement in the (1) moulding, (2) hammering and (3) lathe work.

GOLD AND SILVER WIRE.

The various branches of the gold and silver industry are:

(1) Kandila Kashi—or beating out of a piece of plain silver, or silver plated with gold leaf, into thick wire.

(2) Tarkashi—the process of lengthening out the thick wire into thin wire or thread, the thinness being regulated according to the purpose for which the stuff is wanted.

(3) Tardabhana—or the flattening of the thin wire to produce what is known as *badla*, used for making laces or *kamdani*.

(4) Kalabatun—making, or the twisting of the gold or silver thread round silk thread to produce a composite twist which is used in the weaving of brocade and similar stuff.

(5) The manufacture of *salma* (wire curled into a special form) and *sitara* (stars and spangles) used for embroidery. These are made out of either round thin wire or *badla*.

(6) The weaving of gota or lace with a silk or cotton warp and *badla* woof.

(7) Zardozi or embroidery of fine cotton, silk or velvet cloth with *salma sitara*.

(8) Kamdani or embroidery of cotton, silk, or velvet cloth with gold or silver wire and thread. The causes of decline of this industry are:—

(1) the use of gold thread imported from Lyons in France.

(2) the use of false smoked *Kala batun* in which there is no gold or silver.

It is extremely difficult to suggest steps for the revival of the *kalabatun* industry. A great saving of labour may be effected and uniformity in the thickness of the wire achieved by employing draw bench of the English artisan for the preliminary processes. Two improvements in tools may be noted. One is a machine for hammering the gold or silver wire to the flatness required for *badla*. The other is a ring spindle arrangement to wind gold thread round silk in order to manufacture *kalabatun*. Both these machines are worked by hand.

JEWELLERY.

Generally it is found that the traditional types of Indian jewellery are giving way to the jewellery of European patterns among the better classes.

IRON AND STEEL WORK.

The question of the development of the iron and steel industry must occupy an important place in any comprehensive scheme for the industrial regeneration of India. The number of workers of iron and steel and the production and consumption of these metals in the

country may be taken as a measure of its industrial prosperity and civilization. This industry may for convenience be subdivided as follows:—

(1) the industry of the ordinary village blacksmith;

(2) the industry in cutlery, steel trunk, agricultural implements;

(3) the higher branches, such as iron foundry, moulding, workshops, etc.

The most important step towards progress in this industry would be to start some factories in central towns for the manufacture of cutlery and other hardware.

CANE AND BAMBOO.

• If the artisans can turn out new designs and better class of goods under expert supervision there is no reason why India should not build up an export trade in fancy and useful basket work.

FRUIT GROWING.

The fruit growing industry has immense possibility in many parts of India. Profitable industries can be built up by growing pineapple, orange, plantain, mango, coconut, betelnut, etc.

OPENINGS.

There is an opening for educated young men in analytical chemistry provided accuracy could be obtained, and also in the manufacture of chemicals, if business enterprise accompanies knowledge.

There are openings for the manufacture of umbrella, paint, hosiery, braziers, soaps, candles, lamps, leather articles and in the preservation of fruits. Also in the following:—Dyeing and cotton printing, soap making, lac refining, glass manufacture, varnish and paints,

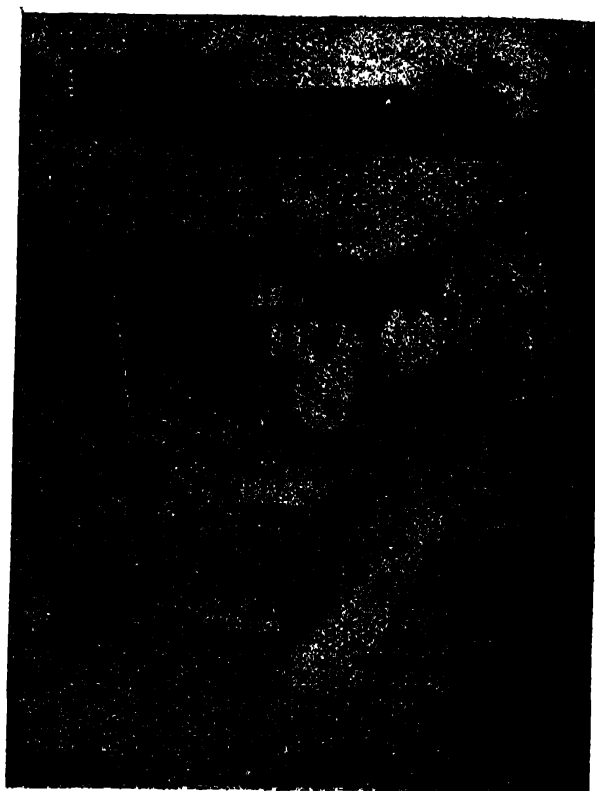


Fig. 12. Cane and Bamboo Weaving.

scents, cement, matches, tanning extracts, oil, enamelled ware, pencils, tobacco, silk weaving, rice bowls, and in sugar.

CO-OPERATIVE MOVEMENT.

Much can be achieved in the way of village reconstruction by the adoption of co-operative principles in many departments of our activities. We have already referred to the consolidation of small agricultural holdings. Co-operative credit societies will benefit the cultivators; co-operative banking facilities must be provided for fostering indigenous industries and trade. Co-operative sale societies should market the products of agriculture and industries. Raw materials for industries may also be bought cheaply by these societies. In-

deed co-operation can be applied both in production and distribution. In that way the greater part of the profit can be kept for the labourers themselves and their lots improved. As it is the lion's share of the bargain goes to the pocket of the greedy middlemen. They are enriched at the expense of the artisans who are impoverished.

Co-operation in purchase, production and sale will enable the artisans to overcome difficulties presented by lack of capital and encroachment of large scale industry. The preservation of the ancient handicrafts of India is an urgent problem in which are involved the interests not only of the millions whose subsistence depends upon them and who cannot be left to the tender mercies of the forces of foreign competition and modern industrialism, but also of Indian culture, indigenous arts and the social and economic well-being of the masses of people. What is wanted is capital, organization, education and improved tools.

The chief industry in India is agriculture, and the principal wants of the raiyats may be stated as the means to purchase cattle, to obtain a water-supply and to get cheap credit. It is not merely the heavy rate of interest the peasant has to pay that keeps him poor. Far worse is the necessity on his part to sell to the local money-lender, at the latter's price, the result of his year's work, and to borrow from him the means of subsistence and the seed for the next year's crop.

Through Village Bank the loans need not be restricted to agriculturists

only. Trades can be fostered, provision being made for the instant calling in of capital when not used for the purpose for which it was borrowed.

CO-OPERATIVE BANKS. ' .

In studying the history of village unions throughout Europe, it will be seen that, notwithstanding innumerable difficulties, rural co-operative associations found banks to finance them and spread with great rapidity, changing the farmer in most places from the poverty-stricken slave of the usurer to a man of comfortable independence.

As in Europe the beginnings were small of the great co-operative credit societies that spread a net-work over the whole Continent, so in India the poor village partnerships that already exist and the small unions for common objects that can be traced back for ages may serve as the nuclei of the village banks of the future that will save the peasant from the sowcar and point the way to prosperity and contentment.

With the village system of India there have been from time immemorial a number of co-operative schemes in existence. These want only development, and with a little education and adoption of means successful all over the world, there is every reason to prophesy a revival that will make India a marvel to the rest of the world, when wealth will pour in as the land is developed and manufactures follow upon the improved status of the peasant. With the arrival of Village Banks and the withdrawal of the sowcar, let us hope, that that day will not be far distant. But the very

first step to aid the Indian raiyat must be the establishment of Central Banks in every district in India. The question then arises as to the distribution of money from this central source. The security is there in sufficiency. The question here concerns the establishment of Agricultural Bank only meant principally for loans to cultivators to help them with funds, when most necessary, with the object of enabling them to get the best profits from their lands. Such will always require careful and conscientious management; but as they are likely to be small, and restricted to the area on which they depend, the risks run will also be few and trivial.

But in treating of the revival of agriculture in this country it must be borne in mind that combination is the first essential. A little study of the villages and village life in India will show so much co-operation existing on a small scale, that the difficulties to be encountered need be considered no greater than those met with in Europe a few years ago.

The watch word then must be "Combine". It is the secret of all success in Europe, America, and Australia and in India will be the bed-rock on which a mighty structure will ere long be erected.

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Mr. Aziz D. Ahmed, 117, Aziz Building, Simla, writes under date of 11th August, 1925:—

I should not lose this opportunity of congratulating you on the very up-to-date and attractive appearance of INDUSTRY, as visible from the April issue, which it is a real treat to go through now from beginning to end and reflects a great credit on your printing establishment.

DYEING RECIPES—II

(By a Practical Expert).

RECIPES of dyeing cotton, silken and woollen materials appeared in our previous issue. We give below a few more recipes, especially of dyeing cotton and yarns, etc.

DYEING COTTON.

YELLOW.

First of all 3 oz. of sugar of lead is dissolved in 3 seers of rain water, previously warmed a little. The cotton to be coloured is dipped into this solution and is kept immersed for some time. Now prepare a solution by dissolving $1\frac{1}{2}$ oz. of bicarbonate of potash in 4 seers of cool water. The cotton after being taken out of the sugar of lead bath, water is wrung out of it by light pressure and is next steeped into the carbonate solution. Remove when the cotton assumes a yellow colour. Finally wash in rain water and allow to dry. If the shade of colour obtained is rather light, the process should be repeated.

BLUE.

Dissolve 4 oz. of copper sulphate in 3 seers of water. Then steep the cotton in this solution which is then to be boiled for one hour over a gentle fire. In the mean while prepare another solution by dissolving $\frac{1}{2}$ oz. of prussiate of potash and 2 dr. of sulphuric acid in 2 seers of warm water. The cotton is duly taken out of the copper sulphate solution and water is wrung out of it by pressure of hands. Next steep the cotton into the second solution and leave it there undisturbed for half an hour. Then allow to drip and dry.

PINK.

Add $1\frac{1}{2}$ seers of powdered Brazil wood and $\frac{1}{2}$ seer of powdered Lodh wood to 6 seers of water in an earthen vessel and boil the solution over a gentle fire till two-thirds of the solution is left. Next add 2 dr. of powdered borax and remove the vessel from the fire. Allow to cool and then strain through a cloth. To colour the cotton pink, it should now be immersed into this clear bath and left there for four hours. Then take out, wring out the water and allow to dry.

RED.

Dissolve 2 oz. of scarlet dye in 4 seers of warmed rain water. Allow the cotton to soak in this solution for one hour. Finally take out, wring the water out and allow to dry.

VIOLET.

Mix 2 oz. of violet dye in 4 seers of water and stir vigorously. Now add to this one dram of violet archil. Dip the cotton in this solution for one hour. Then remove, wring the water out and allow to dry.

GREEN.

Dissolve 2 oz. of green aniline dye in 4 seers of tepid warm rain water in an earthen vessel. Steep the cotton in this colour bath for 4 hours and while taking out squeeze out the watery colour by slow pressure of the hands. To the colour bath then add one dram of sulphate of copper dissolved in water. Steep the cotton again in this bath for some time and take out when the cotton is properly coloured. Finally allow to drip and dry.

DYEING YARNS AND PIECE-GOODS.

The following recipes show the methods of dyeing yarns and piece-goods in fast colours. The yarns and piece-goods to be coloured are often bleached prior to their steeping in colour baths. The usual process of bleaching is given below in brief.

First shred $2\frac{1}{2}$ seers of laundry soap of the best variety and drop in 10 seers of water. Then boil the whole and when the soap is well dissolved add 4 chhataks of powdered borax. After some time the yarns and piece-goods to be bleached are introduced into the bath and the boiling operation is continued. Stir the goods well upside down and finally remove the vessel from fire. After 12 hours wash the yarns, etc., well and allow to dry.

RED.

First dissolve 1 lb. of scarlet dye in 10 seers of water in an earthen vessel and mix intimately. The yarns, piece-goods, etc., which are to be previously bleached according to the method given above. Steep the bleached materials in the colour bath for 24 hours and stir well. Finally take out and wring out the colour. Then in another vessel dissolve 1 oz. of chloride of tin in 10 seers of water and dip the dyed goods into this solution. After one hour take them out and squeeze out the colour and allow to dry. The colour will then be bright.

BROWNISH YELLOW.

First mix well the annatto seeds about 2 seers in weight with 4 chhataks of good fuller's earth and leave them in 1 seer of hot water for 4 hours

and then rinse them well. Then in a vessel take 16 seers of water and bring it to boil. When boiling drop the annatto seeds into it and go on boiling. When two thirds of the liquor is left, remove from fire and when cool strain through a piece of cloth. To this then add $\frac{1}{2}$ oz. of chloride of tin and steep the yarns, etc., after bleaching them properly for 12 hours in this solution. Then remove, wring and dry.

GREEN.

Dissolve 1 lb. of green aniline dye in 16 seers of water and steep the yarns, etc., in this solution for 12 hours. Also prepare another solution with 4 oz. of copper sulphate in 10 seers of water. Remove the yarns from the first solution and after wringing well dip in the second solution and rinse the goods well. Then remove, wring and dry.

VIOLET.

Mix 8 oz. of violet aniline dye in 10 seers of water and steep into this solution previously bleached cotton goods for 12 hours. Also prepare a solution with 2 oz. of pearl ash in 8 seers of water and transfer the goods from the first solution after wringing well into the second solution. Stir the materials well and then remove, wring and dry.

BLUE.

Make 4 chhataks of country indigo into a paste by braying on a stone plate with water and mix this in 10 seers of water. To the solution then add 4 oz. of archil and steep the articles to be dyed after proper bleaching in this solution for 1 day and turn up the mass occasionally. Finally remove,

wring and wash in a solution of 2 oz. of pearl ash in 12 seers of water. Again wring and dry.

BLACK.

Allow powdered gall nuts, 2 seers in weight, to soak in 15 seers of hot water in an iron pan for 6 days and bring to boil till 12 seers of the liquor is left. Keep the pan aside with the liquor for 16 days. Then strain through a cloth and add 1 oz. of pyrogallie acid. Then steep previously bleached yarns, etc., into this solution for 1 day and finally remove, wring and dry.

SCARLET.

In this recipe the yarns, etc., need not be bleached previously.

Dissolve 1 lb. of scarlet dye in 16 seers of water in an earthen pan and bring to boil. Then steep the yarns or piece-goods and go on boiling for one hour. Then remove from fire and allow to cool. Again steep the materials for one hour in a solution made by dissolving 1 oz. of chloride of tin in 12 seers of water. Finally wash in soap solution and dry.

DYEING SILK.

BLUE.

Wash the silk well and steep in a solution of 1 chhatak of iron sulphate in 2 seers of hot water. After some time remove and wring out. In another pan prepare a solution by dissolving 1 dr. of prussiate of potash and a little sulphuric acid in hot water. Now immerse the silk in the second bath, finally wash in clean water and allow to dry in air after wringing properly.

CRIMSON.

Bring to boil 4 oz. crimson aniline

dye dissolved in 4 seers of water. Steep the silk to be dyed in this bath for 5 min. and heating should be continued. The silk should be washed and dried prior to immersion in the bath. Then remove from fire, wring out and allow to dry in the air.

ORANGE.

Prepare a solution with 4 dr. of red aniline colour in 2 seers of water and steep previously washed and dried silk in this bath for half an hour. Rinse well, and remove and wring out. Then steep this in yellow aniline dye bath made by dissolving 1 oz. of the dye in 2 seers of water. Rinse well and finally transfer in a solution made by dissolving 2 dr. of chloride of tin in 1 seer of water. Rinse well, wring and dry.

GREEN.

Dissolve in an earthen vessel 1 oz. of green aniline dye in 2 seers of water and steep into this, for 15 minutes, silk previously washed and dried. Then remove and place in another pan. Now prepare a solution by dissolving 30 grains of chloride of tin in one seer of water and dip the dyed silk in this bath. Finally remove; wring and dry.

DYEING WOOL.

SCARLET.

Bring to boil 3 oz. of scarlet aniline dye dissolved in 3 seers of water in an earthen pan and then drop in 3 dr. or powdered borax and go on boiling. After 15 minutes, remove from fire and allow to cool. Then add 2 dr. of chloride of tin to the colour bath and steep the wool to be dyed in this solution for half an hour. Then take out, wring very lightly and allow to dry.

ORANGE.

First dissolve 1 oz. of red aniline dye in 4 seers of water in an earthen vessel and bring to boil. After some time remove the pan from fire and allow to cool. Now steep the wool to be coloured in this bath for half an hour; then transfer this after wringing lightly into a bath made by dissolving 2 oz. of yellow aniline in 4 seers of water. Remove after two hours, wring out lightly and then dry.

YELLOW.

Prepare a colour bath by dissolving yellow aniline dye, 4 oz. in weight, in 4 seers of water. Steep the wool in this bath for two hours and then remove. Now add 2 dr. of white tartar to the bath and again steep the wool in this bath. Then wring lightly and dry.

DYEING COTTON GOODS.**SAFFLOWER COLOUR.**

Let stand for 12 hours one seer of safflower in 8 seers of hot water in an earthen vessel. Next bring the whole to boil over a slow fire and after quarter of an hour add 2 oz. of cream of tartar to the boiling liquor. After half an hour add 2 oz. of powdered borax and continue boiling till 2 seers of the liquor is left. Then remove and strain when cool. To this then mix $\frac{1}{2}$ oz. of chloride of tin and steep the cotton goods to be dyed in this bath for one hour. Then take out, wring out and allow to dry in the shade.

ORANGE COLOUR.

Mix 1 seer of annatto seeds and $\frac{1}{2}$ chhatak of nitre very intimately and pour over the mixture one seer of hot water and let stand for 6 hours. Then take the seeds out and drop them in 8 seers of boiling water. Rinse the seeds well and continue boiling. When the liquor is reduced to half add 1 chhatak of powdered borax and continue boiling for 15 minutes more. When cool, strain through cloth and mix 2 dr. of chloride

of tin and stir well. Then dip the goods to be coloured in this bath for 15 minutes. Finally take out, squeeze and dry in the shade.

TURMERIC COLOUR.

Bray good yellowish turmeric very finely and dissolve 2 chhataks of the brayed paste in 2 seers of water. Then steep the goods to be dyed in this bath. It need not be mentioned that the goods must be previously washed in soap solution, washed in clear water and dried. Rinse the goods in the bath very well. Then take them out and dissolve a little tamarind in the bath. Again dip the goods in this and rinse well. Finally wring out and dry in the shade.

CHAMPAKA COLOUR.

Prepare a bath by dissolving 4 chhataks of iron sulphate in 4 seers of water and boil till the liquor is reduced to half. Add to the liquor when cool about half a tollah of quicklime and stir well. The cotton goods to be dyed are first cleanly washed and dried and are then steeped into this bath and rinsed well. Now prepare a second dip bath with 30 grains of chloride of tin in 2 seers of water. Dip the dyed goods in the second bath and again rinse. Finally wring out and dry in the shade.

SKY-BLUE COLOUR.

4 oz. of copper sulphate is finely powdered and dissolved in 4 seers of water. Bring the whole to boil and continue boiling till the whole is reduced to three-fourths. Add to this 1 oz. of prussiate of potash, and when cool dip the cotton goods, rinse well and put in another vessel after wringing. Now prepare a second bath in another vessel by dissolving 1 dr. of pearl ash in 3 seers of water. Dip the coloured goods now into this bath and after rinsing well, wring the water out and put in the shade to dry.

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Small Trades & Recipes.

Fire Extinguisher.

This consists of a mixture of twenty parts charcoal, sixty nitre, and five gypsum, boiled together in water, and subsequently moulded into a cylindrical brick. Down the axis of this there is a cavity for the reception of a phial containing a mixture of chlorate of potash and sugar, surrounded by a globule of sulphuric acid. By pushing down a rod the glass containing the acid is broken and the mixture inflamed. The composition is placed in an iron perforated vessel, and gives out a volume of gases which extinguish the fire.

Bleaching Sponges.

Sponges are not often bleached unless they are of a bad colour, because the bleaching process renders them more tender. The following methods are used for bleaching sponges, the colour desired is that of the finest class of naturally-bleached sponge, and that would not be easy to obtain.

(1) The sponges are first soaked in a dilute solution of hydrochloric acid (1 part acid to 200 of water), and then soaked for twenty-four hours in a solution of 1 pt. of hydrochloric acid and 1 lb. of hypo-sulphite of soda in 20 pts. of water. After treatment, remove and wash in running water for several hours.

(2) The sponges are soaked in acid as above, then in a solution of permanganate of potash (2 parts

of permanganate in 100 parts of water) for ten minutes; removed, and soaked in a solution of oxalic acid and sulphuric acid (2 parts of each acid to 100 parts of water) ten minutes, then removed and washed as before. They will be very brown after dipping in the permanganate, but they will lose their colour after dipping in the acid.

Tempering Steel Springs.

The springs should be raised to an even red heat, not too high, to prevent any risk of cracking, and then quenched in lukewarm water. They should then be placed in a ladle containing sufficient tallow to cover, which should be heated till the tallow burns, and then allowed to cool out. A small spring may be tempered by heating to a cherry red and plunging in cold water. Then hold it over a small fire until warm, and cool with tallow, burning off the tallow over the fire, finally cooling in water. The following is a method which has been given for tempering revolver springs. Heat the springs to a cherry red and plunge in linseed oil. Then hold the spring over the fire, and allow the oil to burn away; this should be repeated three times, and draws the temper as desired. The spring should finally be plunged in oil. In heating it is advisable to use an oven if the spring is liable to lose its shape, while stiff springs—such, for example as springs for vehicles—may be heated in a covered forge.

INDIA'S INDUSTRIAL PROGRESS.

Products of Ceylon.

There is a large export of coconut produce in the form of fresh nuts, copra (the dried kernel from which coconut oil is expressed), coconut oil, desiccated coconut (largely used for confectionery), poonac (the residue after the oil has been expressed from the copra, used for feeding cattle, etc.) coir fibre in the form of bristle, rope and mattress fibre; also arrack, the spirit distilled from the palm. This industry is mainly in the hands of Ceylonese.

In addition to the above, arecanuts, cacao (the chocolate bean), cinnamon, citronella oil, plumbago, unmanufactured tobacco, skins, and cardamoms are exported, but the value of these exports is comparatively small. Plumbago is the only mineral found in Ceylon (apart from small quantities of thorium and monazite) but the island is famed for its precious stones, including sapphire, cat's eyes, alexandrite, aquamarine, topaz and moonstones.

Lac Production in India.

Depression in the curious lac-producing industry of India, which supplies the basic material for the bulk of the shellac and certain related varnishes consumed in the United States, has led to an investigation by a committee of experts appointed by the Indian Government, with a view to recommending improvements

in existing methods of collecting, manufacturing and shipping the lac.

The recommendations contained in the recently submitted report of the committee appointed by the Indian Government cover improvements in method of leasing the public forest tracts from which the lac is largely obtained, with longer periods of leases and a sliding scale of royalties; better methods of cultivation and collection, with more adequate supervision by the forest authorities; the establishment of one or two Government factories on a large scale to put the manufacture on an efficient basis, the encouragement of the manufacture of lac products in India and establishment of definite marks and grades to ensure the maintenance of standards of purity and quality.

In this investigation, as in some others of the kind that have of late years been made in various parts of the British Empire, one motive has evidently been to find methods by which the exports and subsequent consumption of Indian lac might be diverted from non-British countries, particularly Germany and more recently the United States, to Great Britain itself. So far there has been small net result from such efforts and there is, perhaps, little likelihood that there will be. As far as the supply of lac is concerned, in any case, it would seem that the opportunities for the ex-

pansion of production in India are considerable and that intelligently directed efforts to develop this production and to improve the quality of the product would indirectly benefit all consumers without much chance of bringing about destructive competition for the supply.

Cottage Industries of Bengal.

To deal only with industries in Bengal which employ no machinery and provide many people in the villages and towns with work, there is the Bankura industry in jardinières and flower bowls—Bankura pies, the Murshidabad industry in bell-metal goods, the Utterpara potteries, the Faridpur bedspread industry, the Bankura and Midnapore silk industry, the Santipur sari industry, the Barnagore carpet industry, the toy industry in Calcutta, the Bankura twill industry, the Barnagore dolls industry, the Calcutta knitting industry, the sandals industry and the brush industry.

It will be seen that Bankura is making praiseworthy efforts to become the home of some of the most profitable industries. The carpets manufactured there are in every way as good as the Mirzapur ones. The dolls made in Barnagore are in many respects superior to those imported from Japan.

Industrial Development in Baroda.

With a view to encourage those industries that have an important bearing on the economic development of Baroda and to aid the progress of commerce among the people in the State, the Government of Baroda have passed a set of regulations defining and enlarging the functions of the Department of Commerce and Industries, so as to facilitate the growth and development of new industries by making economic investiga-

tions and industrial surveys in the State and collecting and compiling statistics relating to industries and trade. To achieve these objects the department is empowered with the sanction of the government to organise an industrial museum, exhibiting the products of the State, to maintain an intelligence bureau to organise exhibitions, to collect specimens of arts and crafts manufactured in the State for exhibition abroad, to hold demonstration classes, to arrange to give scholarships for the study of industries and to arrange for the construction of warehouses at State expense.

Burma Salt Industry.

The Burma salt industry is one of the oldest indigenous industries of the province. Indeed it was at one time in a very flourishing condition, but now, owing to the competition of foreign salt, has suffered a set-back. The local production is approximately 33 per cent. of the quantity consumed in the province. That local production can meet home requirements provided there are facilities for expansion of the industry is clear from the fact that during the war, local production rose to 55 per cent. The Burma salt does not compete with the Indian salt, but with the foreign article. The cost of production is relatively high in comparison with the Indian salt in the uncrushed state but the quality of the product is superior to the coarse-grained Indian. It is a fine-grained, clean, white salt of good quality, similar to Spanish and other salt and compares very favourably with all salt imported into the province except Liverpool salt. The methods of manufacture pursued though crude and primitive, are in fundamentals not unlike those followed in Cheshire.

SCIENTIFIC AND INDUSTRIAL TOPICS.

Synthetic Gold.

A Japanese Professor, has succeeded in manufacturing an extremely small quantity of synthetic gold by artificially disintegrating non-radioactive atoms. He used a very intense electric field to create a shock in the nucleus of the atoms. By subjecting mineral oils not containing oxygen to a concentrated discharge with mercury and tungsten wire as electrodes, and using an induction coil with a spark of twenty-five metres in length, the mercury was converted first into small drops and then into a black pasty mass, the oil being split up into carbon and organic gases. On the distillation of the oil and mercury, and the burning of the carbon, a residue was obtained containing small particles of gold and a white metal composed chiefly of silver. He declares that research was essentially his scientific aim, but he admitted the possibility that later on the process might be industrialised.

Birth of the Moon.

In the opinion of a British scientist the moon is made of material that was once part of the earth's crust. His theory is that a layer of the earth's crust, about forty-one miles thick and covering about two-thirds of the total area, was peeled off by the attraction of the sun. This action of the sun was effective while the crust was still in a plastic

state, and the moon's own gravitational attraction caused it to roll up into a ball of the form we now see in the sky. The crustal area left on earth formed the continents.

This theory also accounts for the fact that while, according to generally accepted ideas, masses of lighter density such as make up the earthly continents should cover the entire surface of the globe, they actually cover only about a third, the missing two-thirds consisting of the moon.

The new theory also fits in with the ideas of a German geologist who believes the American continent was originally united with Europe and Africa, and that it floated away to its present place. This would not have been possible so long as the entire earth was covered with such a crust, but after the moon had been torn away it was possible for the continents to separate from their long embrace.

Cold Light.

The production of cold light is a subject which continues to attract the energies of investigators. Among the latest workers in this field is a French scientist, who has been trying to emulate the performance of the glow-worm, which gives out light without appreciable heat.

It is stated that he has succeeded in making a large tube which, it is claimed, yields a light of 12,000 candle-power for the expenditure of two and a half kilowatts of electricity. His tubes are filled with atmospheric air at reduced pressure, and are excited by high-frequency currents.

After the current has been cut off from them, his treated tubes continue to glow, though with diminishing brightness, for a period said to be equal to that for which they have been excited.

Some tubes that he has exhibited in London are 8mm. in internal diameter, and require for their excitation a current of one-tenth of a milliampere at a pressure of 6,000 volts, and of frequency in the neighbourhood of 1,000,000—and they are twisted into forms suitable for adaptation as illuminated advertising signs or letters. It may be mentioned that the term "cold light" is, strictly speaking, a misnomer, as a certain amount of heat must be generated.

Wireless Marvel.

One of the astonishing facts about wireless is that people listening in hear a lecture sooner than do many people in the hall in which the lecture is being delivered. The explanation is simple.

Suppose a man was lecturing in Aberdeen to an audience in a hall, and that his address was also being broadcast. People in the hall would hear the vocal efforts of the lecturer by sound transmission via the medium of the air while listeners would hear the speaker via the medium of the ether.

Now sound only travels at the rate of 1,086 feet per second, so if you were just that distance away from the speaker and he said "Hallo," it would take just one second for the sound to reach you. And suppose a man in the audience is 50 feet away from the lecturer—who hears

the lecturer first, the man referred to or a listener 3,500 miles away?

Sound, at 1,086 feet per second, will take 0.046 seconds to reach the man in the audience; if wireless waves travel at 186,000 miles a second it requires an interval of 0.0188 seconds to travel 3,500 miles. So the listener 3,500 miles away would hear the lecture 0.27 seconds sooner than the man in the hall 50 feet from the lecturer!

Gold from Mercury.

Some information is given in *Science* relating to the experiments resulting in the production of gold from mercury, recently carried out by Prof. Nagaoka of the Institute of Physical and Chemical Research, Tokio. A pressure of millions of volts was employed, which by a special device, was concentrated upon a narrow space in the immediate neighbourhood of the surface of the mercury. On evaporating the mercury, gold was deposited on the bottom of the vacuum distilling apparatus in a very thin film. The experiment was carried out in an extremely intense electric field. In order to be sure of transmutation repeated purification of the mercury by distilling in a vacuum at temperatures below 200 deg. was essential. The object of the research is not the production of gold in commercial quantities but the study of internal structure of atoms. From an investigation of the fine structure of the lines of mercury spectrum, it seemed to the Professor that the nucleus of the mercury atom consisted of a compact central mass with a proton particle elastically connected with it and that if this proton could be detached from the mercury atom by some sufficiently powerful force the remaining nucleus would have the same positive charge as that of gold and a similar arrangement of electrons.

PUJA SPECIALITIES.

PARLOUR FIRE WORKS.

The only fire-works suitable for a parlour display are the lightning paper. To make these mix together equal parts of strong nitric and strong sulphuric acid, place in a jar, and put into it very thin blotting paper cut in small squares; allow these to soak for twenty or thirty minutes and then take them out with a glass rod and throw them into a bucket of cold water; allow water to run into the bucket from the tap for about an hour. Now remove the papers and dry very carefully, as they are very inflammable. Held at one corner, and a flame applied, they flash up immediately and must be thrown towards the fireplace. If coloured flashes are required, dip some of the above papers in solutions of the following, and again dry carefully. For pale green use nitrate of barium; deep green, nitrate of copper; yellow, nitrate of sodium; violet, nitrate of potash; crimson, nitrate of strontium.

ANOTHER RECIPE.

Finely powder any of the following salts and make into a solution in pure methylated spirit. Dip the paper in the spirit, and set fire to it.

Potassium chloride	for	pale violet.
Sodium	"	yellow.
Barium	,	pale green.
Calcium		orange.
Lithium	"	purple.
Copper	"	dark green.
Copper nitrate		emerald.

ANOTHER NOVELTY.

Mix 12 parts of salt petre, 15 of flowers of sulphur, and 30 of gunpowder.

Then dissolve 2 parts of camphor in 8 of spirit of wine, and 4 of gum Arabic in water. Knead the whole into a dough, and form small cornered pieces from it which are dried. When ignited they give a beautiful light.

JAPANESE MATCHES.

The ingredients for Japanese matches consist of 5 parts of lampblack, 11 of sulphur, and 26 to 30 parts of gun powder. The mixture is made into a paste with alcohol, formed into small dice, and dried. When dry one of the little square is fixed into the cleft of a stalk, lighted on a candle, and held stem downward. After the first blazing off, a ball of molten lava will form from which the curious and very beautiful corrugations will soon appear.

LANCES AND STARS.

Lances are small straight cases charged with compositions like those used for making stars. They are mostly used in complex devices, for which purpose they are fixed with wires on suitable wooden frames. They are connected by leaders, i.e., by quickmatch enclosed in paper tubes, so that they can be regulated to take fire all at the same time, singly or in detachments, as may be desired. The devices constructed in the way are often of an extremely elaborate character; and they include all the varieties of lettered designs, of fixed suns, fountains, palm trees, waterfalls, mosaic work, etc.

Roman Candles are straight cylindrical cases filled with layers of 'composi-

tion and stars alternately. These stars are simply balls of some special composition, usually containing metallic filings, made up with gum and spirits of wine, cut to the required size and shapes, dusted with gunpowder, and dried. They are discharged like blazing bullets several feet into the air, and produce a beautiful effect, which may be enhanced by packing stars of differently coloured fire in one case. We append a few recipes of stars and lances.

LANCES.

1. **BLUE.**—Chlorate of Potash 5; Calomel 4; Sulphuret of Copper 4; Shellac 1.

2. **CRIMSON.**—Chlorate of Potash 16; nitrate of strontium 16; sulphur washed 5; Fine charcoal 1.

3. **GREEN.**—Chlorate of Potash 16; nitrate of Barytes 16; Washed sulphur 5; fine charcoal 1.

STARS.

1. **COMMON.**—Salt petre, 1 lb; Sulphur, $4\frac{1}{2}$ oz; Antimony, 4 oz; Isinglass, $\frac{1}{2}$ oz; Camphor, $\frac{1}{2}$ oz; Alcohol, $\frac{3}{4}$ oz.

2. **WHITE.**—Mealed powder, 4 oz; Salt petre 12 oz; Sulphur, $6\frac{1}{2}$ oz; Oil of Spike, 2 oz; Camphor, 5 oz. The above are to be made into balls, rolled in grain-ed powder and dried in the sun. Used in Roman candles, rockets, etc.

3. **TRAILED STARS.**—Salt petre. 4 oz; Sulphur 6 oz; Sulphate of antimony, 2 oz; Rosin, 4 oz.

4. **WITH SPARKS**—Mealed powder, 1 oz; Salt petre, 1 oz; Camphor, 2 oz.

5. **COLOURED STARS.**—These may be made by using any of the receipts for coloured fires, with a solution of icing

glass, $\frac{1}{2}$ oz; Camphor, $\frac{1}{2}$ oz; Alcohol, $\frac{3}{4}$ oz; Make into balls of the requisite size, roll in gun powder, dry in the sun.

Coloured Fires.

Any salt of copper dissolved in spirits of wine makes it burn with a bright green light. Place 1 oz. of spirits of salt in a gallipot, add enough nitrate of strontia to make a thick paste on mixing. Dry slowly over a dying fire or on the hob. The fumes, being poisonous, must be allowed to escape up a flue. When cooled, add about 4 oz. of pyroxylic spirit. Bottle for use. Lamp-cotton, etc., dipped in the mixture burns with a vivid crimson light. Muriate of soda (common salt) burns yellow when dissolved in spirits of wine. Muriate of potash makes the flame a violet one; muriate of lime, dull red, muriate of litha, red; muriate of baryta, pale green; chloride of calcinm, orange; chloride of lithium, purple. The salts may be mixed with sulphur instead of spirits of wine if more convenient. A brilliant white light is made by mixing upon a sheet of glazed paper, with a paperknife, the following: Nitre, 1 lb; sulphur, 5 oz., sulphuret of antimony $5\frac{1}{2}$ oz. Light with a match, in small quantities.

HOME HINTS.

For brightening and cleaning a carpet use potato water. Scrape finely two or three potatoes in a quart of warm water, and let them stand for ten minutes. Strain, and use the water to rub over the carpet.

Paper burned to a white ash and rubbed on silver with a cloth will produce a good polish.

To keep brass plates and handles untarnished rub a raw potato over them after they have been cleaned. This will keep them bright for several days.

FORMULAS, PROCESSES & ANSWERS.

Cuttlefish Bone.

1444 K. S. R., Chakradharpur.—Asks what is cuttlefish bone and what are its uses?

This is a calcareous body, situated underneath the skin, in the back of European seas. It is oblong-oval, from five to ten inches long, and from one and a half to three inches broad, somewhat convex on both sides, with thin edges, of a rather firm consistence upon the upper surface, very friable beneath, and composed of numerous layers, loosely connected, so as to give to the mass a porous consistence. It is lighter than water, of a white colour, a feeble sea odour and a saline taste. It contains from 80 to 85 per cent. of calcium carbonate, besides animal matter; a little common salt, and traces of of magnesia. Its fine powder may be given as an antacid, and it is sometimes used as an ingredient of tooth powders. Small pieces of it are often put into bird cages that the birds may rub their bills against them, and the powder is employed in polishing. Another product of the cuttle-fish is a blackish brown liquor, secreted by a small gland in an oval pouch, communicating externally near the rectum by a long excretory duct, through which the animal is said to have the power of ejecting it at will. This, when taken from the fish, is dried, and used in mak-

ing the water colours *sepia* and a writing fluid used by the inhabitants of China, and Japan. It is not the India ink of commerce, which is made from a specially prepared lamp black.

Ferro-gallic Process of Printing.

1495. A. S. A., Moulmein—Writes, Please describe the ferro-gallic process of printing.

Ferro-gallic process of printing is effected by means of ferro-gallic papers. These are of two kinds; one, often termed "water bath" carrying on the sensitised surface a developer which will become active on contact with moisture; the other kind, termed "acid bath," must be treated with a separate developer.

Exposure is the same in both cases. To secure the best results water bath paper should be plunged, face downwards, in still water for a couple of minutes and then rendered to a separate bath for thorough washing. These papers are usually developed face upwards in exactly the same manner as ferro-prussiate, but this method has a tendency to weaken the lines, because a certain amount of the developer is washed off before it has had time to exert its full action.

Acid bath papers are developed either by plunging the prints into a solution of gallic acid contained in a

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lead-lined bath, or by laying the print face upwards in an empty bath and pouring developing solution over the surface, and distributing by means of a broad, flat brush. This latter method gives the best results, especially if warm developer is used. Water bath papers are prepared to save users the trouble of mixing developer, but if the water is cold, and the prints are developing slowly and poorly, they can often be strengthened and improved by flushing over with warm developer. Staining is also avoided, because a clean developer is used for each copy.

The developer is prepared by dissolving 3 oz. gallic acid in boiling water and adding cold water to make up to 1 gallon. It will keep good for a very long time if stored in a stoneware jug or bottle, and users of "water bath" should always have a small supply handy.

After development the copies must be washed very thoroughly in clean water to absorb all the gallic acid, otherwise the prints will in time become brittle.

Water bath papers are more liable to injury from damp than acid bath and decay more rapidly, owing to the presence of the developer on the paper.

Manufacture of Citric Acid.

1296. A. K. P. Palana—Wants to manufacture citric acid from lemon juice.

The manufacture of citric acid from concentrated lemon juice is extremely simple. A proper quantity of whiting (levigated chalk) is mixed with water, and heated by steam in a wooden vat provided with a revolving agitator; the

concentrated juice is then slowly pumped in, care being, of course taken that the whiting is finally in small excess. The liquor never becomes neutral, however long boiling may be continued, or however great is the excess of washing presents; the adjustment of juice and whiting is therefore effected by ascertaining if the liquor effervesces with more whiting, or the precipitate effervesces with more juice. Pure citric acid is readily neutralised by whiting, malic and aconitic acid are not; the final acidity is thus possibly due to the presence of these acids. Citric acid, however, is not neutralised by chalk if phosphates, and especially ferric phosphates, be present, this fact will also explain the result. It is not advisable to neutralise completely by the use of lime, as vegetable impurities are then thrown down which are afterwards difficult to separate.

The precipitated calcium citrate is washed with hot water on a filter. It is next brought by the addition of water to the state of thin cream, and decomposed, with constant agitation, by the addition of a small excess of sulphuric acid. The occurrence of an excess of sulphuric acid

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is known by the liquor affording a precipitate with a strong solution of calcium chloride after some minutes' standing.

The citric acid liquor is then separated from gypsum which is washed on a filter. The liquor is evaporated in shallow leaden baths by steam heat. Much gypsum is at first deposited; from this the clear liquor is run off and further concentrated. When strong enough to crystallise, the hot liquor is run into a wooden tub provided with an agitator, and the liquor is kept in constant motion while cooling; by this process, known as 'granulation', the citric acid is obtained as a crystalline powder. The mother liquor is again concentrated, and 'salt' again obtained by granulation. The process may be repeated a third time. The liquor is then too dark and impure for further crystallization, and is known as 'old liquor.' The granulated citric acid when drained, and, if necessary slightly washed, is redissolved, decolourised by heating with animal charcoal (previously freed from phosphates by hydrochloric acid), again concentrated to the crystallising point, and poured into leaden trays about 3 inches deep; the crystals here formed are the citric acid of commerce.

Clarifying and Refining Oil.

1439. A. D. K. S., Trichur.—Desires to be enlightened on clarifying and refining oil.

Several processes are employed for refining and clarifying oils.

(1) Thenard process. In employing sulphuric acid as a clarifying agent it is essential that no large excess should be used, since otherwise a charring action is apt to affect the oil itself, darkening its colour and depreciating its value. In refining linseed oil from one hundredth to one-fiftieth part (1 to 2 per cent.) of acid is thoroughly intermixed with the oil in an efficient agitation at a temperature not exceeding 40 deg. C. (about 104 deg. F), and the whole allowed to rest for twenty-four hours 60 to 70 per cent. of warm-water at about 60 deg. C (140 deg. F) is then well intermixed and the whole allowed to stand for some days; a watery acid liquid separates at the bottom with a layer of flocculent "foots" above which is the clarified oil, which is drawn off and again agitated with warm water as before to wash out any residual suspended vesicles.

Rape (colza) and linseed oils and certain fish oils are those most usually refined by the acid process.

(2) Alkaline Refining Process. Processes where alkalis are used as agents for coagulating and removing mucus albuminoids, etc., have several advantages over the acid methods, notably that free fatty acids and resins are also removed. The quantity and strength of the alkaline lye employed vary with the nature of the oil to be treated, any undue excess is apt to lead to more or less consi-

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derable loss, not only by producing more saponification but also because the extra amount of saponaceous products gives rise to the formation of more foots containing clarified oil entangled therein. The requisite quantity of lye and the oil are well agitated together by any suitable mechanical mixer (either in the cold or heated to the necessary temperature, as the case may require), and the whole then allowed to settle. A heavier watery fluid with soapy foots separates; this is drawn off and the process repeated with a much weaker alkaline solution, and subsequently with plain water.

When considerable quantities of resin are present, as in the case of cotton seed oil, the lye may conveniently be of specific gravity 1.06 up to 1.10 in such cases it frequently happens that the watery layer and foots will not separate thoroughly from the oil without the subsequent addition of a little salt or brine.

Preparation of Dextrin.

1477. A. R. Q. S., Ambala City.—Writes, 'What is dextrin and how is it prepared?'

The term dextrin is applied somewhat loosely to the earlier products of the hydrolysis of starch. The sugar yielded by the action of diastase on starch is maltose, and at one time dextrine was supposed to be a single substance intermediate in composition and chemical locus between starch and maltose. It is now, however, generally conceded that dextrin and maltose are produced concomitantly from the hydrolysis of starch, and that at least two dextrans are to be

distinguished; they are characterised by their behaviour with iodine, one giving no coloration, while the product of the other is red. Commercially, dextrans are not classified in this manner, but differentiated by their respective methods of preparation. The first method of manufacture consists in roasting dry starch at a temperature of 220 deg. to 250 deg. C (428 deg. to 482 deg. F.) either over a direct fire, or, better, in an oil bath, or by superheated steam. Revolving roasters are often used. The process is continued until the starch has acquired a brownish colour and has become soluble in water. The second method is carried out by moistening the starch with about 1 per cent. of hydrochloric or nitric acid and slowly heating it in open dishes until a temperature of about 100 deg. C, or 212 deg. F, has been reached, and the acid has been evaporated. The sugar accompanying dextrin made by the use of an acid is dextrose. Dextrin made in this manner is lighter in colour than that obtained by direct roasting, and is thus better fitted for certain uses. On the other hand, any residual trace of acid is an objection for many purposes. A special grade of dextrin of light colour, and having the translucent appearance of gum arabic, is also manufactured as a substitute for natural gums.

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BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

1311. K. S. V., Madras.—Two articles on the manufacture of aerated water appeared in October 1924 and April 1925 issues. For industrial and chemical books write to Chackravartty Chatterjee & Co. Ltd., 15, College Square, Calcutta. For prospectus of the Institutes of Chemists London correspond direct.

1312. S. A. Warangal.—For inkpots enquire of Calcutta Glass and Silicate Works, Belgachia, Calcutta. Wants to be put in touch with wholesale dealers of mohua oil.

1314. G. D. S., Savantwadi.—Litho stones may be bought of The Litho-stone Manufacturing Co., 1103, Kalasi Palayam, Bangalore City and Probhakar & Co., Bazar Square Sagar, Shimoga.

1315. M. M. B., Bombay.—An article on flour milling appears elsewhere in this issue. For various kinds of chemical salts enquire of Allen Frederick & Sons, Ltd., Upper North Street, Paplar, London E. 4; West Ham Chemical works Ltd., 8, King William Street London E. C. 4 and Goldschmidt Kimel, Kaiser Wilhelmstrasse 41, Hamburg, Germany. You may go through Crystallography to be had of Chackravartty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

1317. M. S. Y., Tawevi.—You perhaps require a barometer which may be supplied by Bengal Scientific Supplies Co., 29/30, College Street Market, Calcutta.

1319. D. J. P., Bombay.—For trade mark registration write to P. Lodge & Co., Post Box 6772, Calcutta.

1323. R. S. K., Rampore.—For securing services write to Kapoor & Co., Fatehpuri Road, Delhi. Service Securing Agency, London House, Lansdowne Road, Apollo Bunder Bombay and Peern & Co., 9, Nazir Lane Kidderpore, Calcutta.

1324. S. H. A., Bombay.—Umbrella fittings may be supplied by Nafar Chand Atta, 43, Armenian Street, Calcutta.

1325. M. L., Ambala City.—Please write clearly what particular industrial goods you require, otherwise it is very difficult on our part to furnish the required address. For particulars regarding 'industrial education in foreign countries write to Student's Information Bureau, 617 Kasba Peth, Poona City.

1326. H. C., Bareilly.—Watches are manufactured by Jura Watch Co., Delemont, Switzerland; Hamilton Watch Co., Lancaster, Pennsylvania, U. S. A; Koch & Co., Seiler Strasse 35, Berlin, Germany and Meyer and Studeli Ltd., 74, Coleman Street, London E. C. 2.

1327. P. A. D. Diwulapitiya.—Boiling point of oil is far greater than that of water. Temperature of fire given in the formula is all right. Bhagawat Gita may be bought of Theosophical Publishing House, Adyar, Madras. Hitopodesa may be supplied by Sanskrit Press Depository, 30 Cornwallis Street, Calcutta.

1328. A. K. L. Dacca.—For used stamps write to V. R. Sundaraja Sarma & Co., Bhavangadi, Fort Trivandrum and the Calcutta Philatelic Mart 46, Police Hospital Road, Calcutta.

1329. V. D. R., Taruku.—Looking glasses may be supplied by Mohamed Alibhoy Kachwalla & Co., 220-33 Abdul Rehman Street, Bombay and Fotic Lal Seal & Sons, 16, Swallow Lane, Calcutta. Gramophones may be bought of S. N. Bhattacharji & Sons, Dharamtala Street and K. C. Dey & Sons, Lower Chitpur Road, Calcutta.

1332. P. S. R., Vizagapatam.—Addresses of optical goods dealers appear elsewhere in these columns. For securing agency write to these parties mentioning your bank and other references.

1335 S M A, Bareilly There is no such University known to us For further particular write direct to the advertiser

1336 D E N, Allamrnyo Hair clipping machines may be sharpened like other cutlery articles For the required apparatus enquire of T E Thompson & Co Esplanade East Calcutta You may consult the Philatelic Journal of India, The Mail, Lahore

1338 S V M Sitalbaldi—You may contribute articles on technological subject if you so desire

1340 S D N Amritsar—Sewing machines and parts thereof may be bought of Indo German Trading Co, Post Box 243, Madras; Contractor Brothers, Surat and Calcutta Sewing Machine Co, 11, Bentinck Street, Calcutta Needles may be supplied by E B Bros & Co, 11, Dharamtala Street, Calcutta Rubber balloons may be bought of Ali Mohamed Akbar Ali, 22½, Lower Chitpur Road and K A E Eadka 7, Colootolah Street, both of Calcutta Optical goods may be supplied by Lawrence & Mayo Ltd, 16, Old Court House Street, and Stephens & Co Ltd, 275 Bow Bazar Street, both of Calcutta Toys may be supplied by K B Nan, 233, Old China Bazar Street, Calcutta Novelties are imported by Mahomedbhoy Jivabhoy & Co, Nizam Street, Bombay 9 Fountain pens are imported by Nilmoney Halder & Co, 106, Radha Bazar Street, Calcutta Glass bangles may be bought of S Abdul Aziz, 52, Canning Street, Calcutta

1341 R V N N, Bezwada—First work out the formula and let us know if you have any difficulty when we shall try, to solve your difficulties.

1342 J V. S, Tirthaballi—Cardboard boxes are manufactured by Bengal Cardboard Box Manufacturing Co, 64½, Machua Bazar Street, H L Sett & Sons, 8, Nilmony Mitter Street, both of Calcutta An article on iron smelting will appear in an early issue

1343 H P A, Jubbulpore.—Washing Soda May be supplied by D. Waldie & Co, 1, British Indian Street, and Calcutta Chemical Co., 35½, Panditia Road, Ballygunge; both of Calcutta.

1344. P A, Secunderabad—Charkas may be supplied by Monmohan Library, 199, Cornwallis Street, Calcutta

1345 K K C, Iall Bazar—In manufacturing washing soap you may use lard: Gum camphor, silicate of soda and caustic soda may be bought of B K Paul & Co, 3, Bonfields Lane, Calcutta Grease may be supplied by Calcutta Tallow Mart, 19, Tiretta Bazar Street, Calcutta

1347 R G B, Ahmednagar—Formulas of good depilatory soap appeared in the last April issue.

1348 C B S, Nanpalli—If you go through the last two volumes of INDUSTRY you will find some articles on the required subjects.

1350 L C, Patiala—Stationery articles may be supplied by Grebe & Co, Hamburg 36, Koningtrasse, Germany, Fullhalterwork G m b H, Munchen, Hesstrasse 92, Germany, Conkin Pen Mfg Co, Toledo, Ohio, U S A; Joseph Dixon Crucible Co, Jersy City, New Jersy, U S A and Mabie Todd & Co Ltd, Swan House, 133, 135 Oxford Street, London W 1 Woollen hosiery goods are manufactured by Armstrong Broadway & Co Ltd, 68, Basing Hall Street, London, E C 2, Des Moines Hosiery Mills, Des Moines, Indiana, U S A and Milwaukee Hosiery Co, Milwaukee, Wisconsin, U S A. For typewriting material write to Remington Typewriter Co, New York, U S A Wants to be put in touch with cut piece dealers of England, U S A and Germany

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1351. M. P., Ettumanoor.—An article on process block for printing appeared in February issue of 1923.

1352. P. S., Karachi.—Tea may be supplied by Bhattacharya & Co. Ltd., 1, Swallow Lane and Mukherjee Bros., 17-19 Sham Bazar Bridge Road; all of Calcutta.

1353. C. S., Palamcottah.—For spare time work please go through New Idea columns of INDUSTRY.

1354. A. P. Padukka.—You may go through Ubersee Post, 10 Solomanstrasse, Leipzig, Germany. Refer to No. 1353 above.

1356. V. J. M. Bilimora.—Pure finely powdered zinc white (oxide of zinc) is mixed with a solution of soda water-glass of 40 to 60 Beaume to the right consistency for an oil paint. The metallic surface to be painted is thoroughly cleansed and washed with hydrochloric acid, and afterwards with water, and paint is laid on in successive coatings. Not too much paint must be mixed at a time, as it will become thick and dry on standing, on account of chemical combination setting in. A surface thus painted preserves a dazzling white appearance. By adding mineral colours various tints may be obtained.

1357. K. V. R., Hindupur.—Pearls may be bought of Hiralal Nandalal Khettry, 38, Muga-paty, Barabazar, Calcutta.

1358. E. A., Bangalore.—Wants to buy cut pieces of laces and embroideries.

1360. A. A. D., Cochin.—An article on dry battery construction appeared in March 1924 issue.

1361. D. P., Patna City.—For knitting machine enquire of Indo-Swiss, Trading Co., 27, Pollock Street and W. Bradey & Co., 26, Strand Road; both of Calcutta. The full address of the advertiser was published in the June issue.

1362. C. L. J., Rohtas.—Used stamps have no practical utility, sometimes rare stamps fetch handsome price. Your other query is receiving our attention.

1363. P. T. R. Warangal.—Chemicals you require may be bought of B. K. Paul & Co., 1/3 Bonfields Lane, Calcutta.

1364. P. C. S. Jalpaiguri.—You may consult London Directory, 25 Abchurch Lane, London E. C. 4.

1365. P. N. K., Bombay.—For the required book try D. B. Taraporevala Sons & Co., 103, Meadows Street, Bombay and Book Co., 4/4 A, College Square, Calcutta. Process of preparing syrup hypophosphate of lime appeared in June 1922 issue. Heat the melted fat with some sulphuric acid of 1.3 to 1.45 specific gravity, when the fat will separate itself in a pure condition from the impurities and membranous substances. Your other query is receiving our attention.

1366. A. R. K. S., Chanda.—For photo enlargements write to Doran Gallery Arts Studies, 38, York Place, Edinburgh, Scotland.

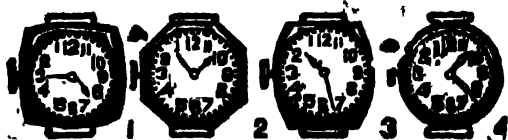
1367. D. G. S. Kotah.—For the price list write direct to the parties.

1368. A. P. T., Daulatganj.—Yes, the hectograph may be found serviceable but in the beginning you should be very careful in taking impression.

1369. D. C., Lahore.—Tailoring is taught a Maharajah Cassim Bazar Polytechnic Institute, Nandalal Bose Lane, Baghbazar; Bengal Tailoring Institute, Raja Nabo Kissen Street and Commercial Institute, College Street Market; all of Calcutta. There are many technical and electrical institutes all over India. You may however write to Bengal Technical Institute, Jadavpore, Dhakuria, 24 Parganas.

137. O. P. A. L., Masulipatam.—A simple cement for glass may be made by dissolving casein in a concentrated solution of borax or

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by making a paste of casein and water-glass. For printing read some books on the subject which may be supplied by Chakravarty Chatterjee & Co. Ltd, 15, College Square, Calcutta.

1371. W. Y., Ajmer.—Watch tools may be supplied by L. Basak & Co., Court House Corner, Calcutta. Chronometers may be bought of James Murray & Co Ltd, 12 Government Place East, Calcutta. Harmonium and accessories may be had of Dwarkin & Sons, Dalhouse Square, Calcutta. Gramophones may be supplied by Carr & Mohalanabis, Chowringhee North East, Calcutta.

1372 A. B. P., Broach—Formula of a good washing soap appeared in the last issue. For improving the colour of the soap you manufacture, use pure chemicals.

1375 R. P., Ranchi—Wants to buy drop black, gold size and Dokey Wellington knife polish.

1376 J. L. Z., Calcutta—Nib making machines may be supplied by Bengal Small Industries Co., 91, Durgacharan Mitter Street, Calcutta. For other machines try Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta.

1377. D. N. G., Dadu Siba—There is no arrangement for learning button making in India.

1378. K. D. Simia.—For commercial book write to Kamala Book Depot Ltd, 15, College Square and Thacker Spink & Co., 3, Esplanade East; both of Calcutta.

1379. S. B. Poona City—Let your toddy ferment then it will by itself be intoxicating.

1380. A. J. M., Bangalore.—For lozenge making machines try Seth Deep Chand & Sons, Old Sukkur, Sind. For particulars of vegetable ghee write to Ralli Bros. direct. Formula of vegetable ghee appeared in the last issue. An article on rose water manufacture appeared in April 1925 issue.

1382. S. L. K. Gujranwala.—For the cans write to Rampratab Gajanand, 6, Halsi Bagan Calcutta. Collapsible tubes may be supplied by Venesta Ltd., 1, Great Tower Street, London, E. C. 2.

1383. B. H. S., Bangalore.—For business directory of France write to Consul-General for France Warehouse Colaba, Bombay. Watch materials may be supplied by S. A. Sanser, Soleure and Donzelot and Cie, Preventury; both of Switzerland and lace may be supplied by F. B. Bros & Co., 11, Daharamtala Street and H. Ahmad Hasan Allawala, 69, Khengriaputty, Barabazar; both of Calcutta. Wants to be put in touch with dealers in cut pieces of laces and embroidery in India.

1386. V. H. T., Ahmedabad.—Cardboards are manufactured by Bengal Paste Board and Paper Mill Ltd, 8, Old Court House Corner, Calcutta. For papers you may try Titaghar Paper Mills Ltd, Chartered Bank Building, Clive Street, Calcutta. For photo enlargement write to Dorian Gallery Art Studios, 38, York Place, Edinburgh, Scotland. Tea may be supplied by *Bhattacharya & Co. Ltd, 64 Cornwallis Street, and Mukherjee Bros 17-19, Shambazar Bridge Road; both of Calcutta. For the required books try Thacker Spink & Co 3, Esplanade East, Calcutta.

1387. P. B. I., Jalgaon—For bleaching cloth you may use bleaching powder, formula of which appeared in November 1922 issue. Process of dyeing yarn appeared in last issue.

1388. C. B. D., Nadiad—To communicate with any querist write him with name and number under care of INDUSTRY when your letter will be duly redirected.

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1389. D. S. T., Bombay.—Full address of Satya Ranjan Roy is Jubbulpore, C. P. Vernacular equivalent of wintergreen oil is not known

1390 S. A., Warangal.—Wants to buy malthua oil in very large quantity

1391. B. N., Monghyr.—For jhu jhu rest swing enquire of K. Keys & Co., 25, Faiz Bazar, Delhi

1393. M. B. H., Darbhanga.—It will be advisable for you to start a liquor shop in European quarters. For getting agencies you may write to the brewers of France and Spain mentioning your bank and other references. For license apply to the Excise Superintendent, Collectorate Office, Calcutta. Capital to be invested depends upon the nature of the business. At least Rs. 10,000 will be required for the above purpose

1395 J. R., Gauhati.—Anath Nath De, 3, Moidapatty and Panchcowrie Tat, 5 Mirbahar Ghat Street; both of Calcutta deal in oils. Soap stone powder may be supplied by Jagadish Agarwalla, 80/1, Grey Street, Calcutta. China clay may be had of Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta. Resin may be bought of Madhab Chandra Daw, 4, Armenian Street, Calcutta. For cinema machines, etc., write to J. F. Madan & Co. Ltd., 5, Dharamtala Street, Calcutta. The above firm will also supply you with the estimates

1396. S. C. B., Chittagong.—You may train your boy at Poona Agricultural College, Poona

1398. S. A. Warangal.—Crown corks may be supplied by N. W. Mitchell & Sons Ltd, 2, Dod Street, Lince House, London 14. For inkpots enquire of Calcutta Glass and Silicate Works, Belgachia and S. K. Dey & Sons, 124, Shova Bazar Street; both of Calcutta. Stearin and stearic acid may be bought of B. K. Paul & Co.,

113, Bonfield's Lane, Calcutta. Paraffin may be supplied by Madhab Chandra Daw, 4, Armenian Street, and Bansidhar Dutt, 126, Khengraputty; both of Calcutta

1400 G. R., Hathras.—For commercial books enquire of Kamala Book Depot Ltd, 15, College Square and Thacker Spink & Co., 3, Esplanade East; both of Calcutta.

1402 K. S. N., Nandapeta.—For starting prospective industries go through September, 1923 issue of INDUSTRY

1403 S. A. S., Patiala.—For lottery tickets write to Secretary, Royal Calcutta Turf Club, 13, Russel Street, Calcutta

1405 C. C., Dhar.—Your query is engaging the attention of our expert.

1406 J. S. D. S., Bareilly.—Hindi equivalents of patchouli are 'peholi' and 'pacholi'. Its Urdu equivalent is not known. Hindi equivalents of Orris root are 'irsa' and 'sosum'. Fly cantharides is a chemical which may be bought of B. K. Paul & Co., 113, Bonfields Lane, Calcutta. Alkanet root is known as 'rangpata'. Coconut oil may be bought of Anath Nath De, 3, Moidapatty, Barabazar, Calcutta and Pragjee Joyaram Tanna, Malabar Coast, Cochin.

1407 R. H., Karachi.—Glass wares may be supplied by Nando Lall Dass & Bros, 194, China Bazar Street; Satya Charan Paul, 194, Old China Bazar Street, and S. K. Dey & Sons, 124, Shova Bazar Street; all of Calcutta. Wants to buy second-hand clothings

1408 S. B. S., Bhurkunda.—You may write to Kapoor & Co., Fatehpuri Road, Delhi. It will be advisable for you to go through the advertisement columns of dailies of Calcutta and Bombay

1410. M. R. B., Bhera.—Catgut strings are imported by L. & A. Brown, 3, Bow Lane, London, E. C. 4. Process of preparing catgut appeared in June 1922 issue.

1411 S. A. G., Rangoon.—You may start a dairy farm with Rs. 500 on a small scale. Cream separator may be bought of P. Lodge & Co., P. O. Box 6772, Calcutta. An article on dairy farm appeared in November 1922 issue where you will find some practical suggestions

WATCHES OF THE DAY.

Swiss Make, Guaranteed. Engine Brand Railway Regulator Rs. 3-14; Gold Gilt Railway (Regd) Rs. 4-14; Rolled Gold Wrist Watch Rs. 7-8; 16 Jewelled Lever Wrist Watch Rs. 15, Postage, Packing and a strap for Wrist watch Free.

Write for wholesale rates

LICHO WATCH CO. (India) Bombay 4.

for starting a dairy farm. Skimmed milk may be utilised in making casein.

1413. N. N. Modasa.—For securing agency you may communicate with Burgoyne Burbidges & Co., Ltd. High Street, East Ham, London., E. C., Schimmel & Co., Miltitz bei Leipzig, Germany and Heine & Co., A. G. Leipzig, U. Grobe, Germany.

1414. M. Q. & Bros, Dera Ismail Khan—Want to buy H. F. compound and H. F. S/p and D/p canvas.

1416. M. S. R. Robbili.—For hair oil manufacture you may go through the booklet on Hair Oil Manufacture published from this office. For essences go through the September 1924 issue of INDUSTRY.

1417. S. C. Hyderabad—Cycles may be supplied by Wellington Cycle and Motor Co., 61, Appolo Street, Bombay; Phiroz Sha & Sons, Kalbadevi Road, Bombay; Bentinck Cycle Co., 40, Bentinck Street, Calcutta and Standard Cycle Co., 59, Harrison Road, Calcutta.

1418. H. P. J. Bombay.—You may approach local rich people either for help or for loan

1419. S. N. H. Mergui—Woollen goods may be supplied by Hiltermann Bros, Eastern House, Harris Street, Bedford, England and Lyon Lord & Co. Ltd., 30 & 32, Broad Street, London, E. C. 2.

1420. V. M. G. Velanpalayam.—Envelope making machines may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta. Brass wares may be bought of Abdul Rahim & Co., Kisraul Dahría and K. S. Jowhar & Sons., Shidi Sera Street; both of Moradabad. Copper wares may be supplied by M. E. Dadabhoy 55, Canning Street, Calcutta.

1421. S. A. T. C. Bezwada.—Toy pistols may be bought of K. B. Nun, 233, Old China Bazar Street, and Pioneer Toy Mart, 10, Old China Bazar Street; both of Calcutta.

1422. M. C. Kahrór.—Tablet making machines may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar St. Calcutta and Kamprimier Maschinen Gessellschaft, Gneisenaustasse, 67, Berlin S. 61, Germany.

1423. M. R. B. Bhera.—Fancy articles of marble stones may be bought of Rup Narain Jai Narain and Sharmen & Sons, Gokulpura; both of Agra. You may consult the Philatelic Journal of India, The Mall, Lahore and The Philatelic Magazine, 87, Emmanuel Road, London, S. W. 2.

1424. S. G. V. L., Bombay.—For woollen yarn enquire of Ladak Trading Co., Bull Bul Lanker, Srinagar, Kashmir and Shanji Mal, Skin Market, Amritsar.

1425. C. N. K., Dhonaji.—You may go through Thacker's Indian Directory to be had of The Thacker Spink & Co., 3, Esplanade East, Calcutta; The Business Directory of India. Burma and Ceylon to be had of The Kanara Press, Madras; Cochin and Alleppey Trade and General Directory to be had of Malabar Herald Office, Cochin and The Indian Manufacturer's Directory to be had of Garg Bros & Co., Saharanpur.

1427. P. K., Dhamtari.—For Ford motor parts try Kilburn & Co., Managing Agents, Ford Motor Co., Ltd, 4, Fairlie Place, Calcutta.

1428. K. S. Gurdaspur.—Process of softening rubber will be found in June 1923 issue. Rubber and tyres may be bought of Bombay Colombo Tyre Co. Ltd., Temple Bar Bldgs, Bombay; Coronation Vulcanising Works, 423, Walkeshwar Road, Bombay; Dunlop Rubber Co. Ltd., 8, Lindsay Street, Calcutta and Don Currie & Co., 9, Clive Street, Calcutta. Wants to know the full address of Rubber World.

1431. Y. R., Savanar. Soap moulds may be supplied by S. A. Manan 62, Machua Bazar Street, P. O. Amherst Street, Calcutta.

1432. S. A., Warangal.—Tallow may be bought of Calcutta Tallow Mart, 19, Tirettra Bazar Street and Indian Bristles & Lard Supply Co., 31/1, Tangra Road; both of Calcutta.

**THE CHEAPEST HOUSE FOR
STATIONERY, CUTLERY & HOSIERY.**

of every description
First Class goods at competitive prices
a trial solicited.
Agents Wanted Apply with Anna Stamp.
KAMRUDDIN MOHAMED UMAR,
IMPORTER AND AGENT.
29, Mirza Street, Bombay 3.

1433. P. H. S. U., Almora.—Coral beads may be bought of Aminchand Mehra & Sons, 34, Armenian Street, Calcutta.

1434. Z. A. R., Gujrat.—For rubber stamps enquire of B N Bysack 1/1, Ramchand Ghose's Lane, P O Beadon Street, Calcutta

1435. T. L. K. Patiala.—For degrees correspond with Universal University, Mahuva, Kathiawar and Dr. C. D. Deer, Nakodar, Punjab For books on advertising enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta.

1438. R. B. S, Chando.—For hair oil you may consult the booklet on Hair Oil Manufacture published from this office

1442. D T. C, Larkana.—Process of refining tallow appeared in March 1924 issue White grease is refined, tallow.. Refer to No. 1432 above.

1443. R. G. N. G, Goa.—Wants to be put in touch with the manufacturers of aluminium buttons.

1445. L. P. C, Motihari.—Aluminium foils may be supplied by Aluminium Foil Co Ltd, 4, Broad Street Place, London, E. C. 2; Bronze Powder Works Co, Elizabeth, New Jersey, U. S. A. and M. Brunn & Co, A-G, Furth, Bavaria.

1447. R. R. S, Fatehgarh.—For industrial books enquire of Chakraverty Chatterjee & Co Ltd., 15, College Square, Calcutta.

1450. V. V. M, Kottapuram.—Wants to be put in touch with dealers in banana flour.

1451. H. C.C.C., Bangalore.—For industrial books enquire of Chackraverty Chatterjee & Co. Ltd., 15, College Square and Thacker Spink & Co, 3, Esplanade East; both of Calcutta

1454. K. T. R, Wadhwan Camp.—Process of preparing casein appeared in February 1922 issue. No other more economical process of preparing citric and tartaric acid is known. Consult a physician.

1455. E. B, Lahore.—For chaulmoogra oil enquire of P. K. Sen, Merchant, Chittagong.

1457. B. H. L., Bangalore.—You may consult Swiss Exporter, Chamber of Commerce, Berne Switzerland. Watches, materials and accessories may be supplied by Weber and Fluch, Soleure and Denzelot and Cie, Poventry; both of Switzerland Optical goods may be supplied by G N. W. Gabric, Nikolaistrasse 11/13, Leipzig and Rietzschel A. H. C. H. G. m. b. H, Schillerstrasse 28; both of Germany. Watch glasses may be supplied by Japan Watch Glass Manufacturing Co, 5 Chome Minami Horiedori, Osaka and Kanishi Kotakundo & Co., 1, Nakabashi Izumicho, Kyobashi Ku, Tokyo; both of Japan

1458 P S R, Dindigul.—Wants to buy essence of tea and dye soap. For the required clocks try our advertisers.

1459. S S V. W. Veeravaram.—For potato starch and oxalic acid enquire of B. K. Paul & Co, 1/3, Bonfields Lane, Calcutta. Tallow and lard may be supplied by Calcutta Tallow Mart 19, Tirettra Bazar Street, Calcutta. Process of finishing cloth will appear in an early issue.

1460. M. S, Lucknow.—The raw wool is generally exported in pressed bales. The unit of sale in the Karachi market is the maund of 84 lbs and in Bombay the candy of 21 Bombay maunds For further particulars refer your query to COMMERCIAL INDIA, the sister journal of INDUSTRY.

1461. N. K. C, Hinoo.—For disposing of fish oil try Calcutta Tallow Mart, 19, Tirettra Bazar Street, Calcutta.

1465. V. R. S, Kanhesanturia.—Wants to be put in touch with dealers in coffee, chillies, palm, etc., of Zanzibar in East Africa.

1466. M. B., Ranchi.—For rolled gold articles enquire of Gulam Hussein Bandeally Heerji, 54, Canning Street and Haji Ismail Sait & Sons, 55, Canning Street; both of Calcutta. For disposing of the merchandise mentioned by you advertise in pages of newspapers and periodicals.

1467. V. R. N. R, Tanjore.—For the required articles and books go through the advertisement pages of INDUSTRY.

FOR ALL MEDICINES

of all diseases order.

C. N. BROTHERS.

Dealing in English patent medicines, . . .

Kanpith Bazar Surat.

1468. P. A. S, Masulipatam.—Reply to your queries appeared in last issue.

1470. S. R. S, Shillong—Your enquiry is engaging the attention of our expert.

1472. S. S, Maymyo.—Eucalyptus oil may be supplied by Ootcamand and Nilgiris Eucalyptus Oil Distillery; Felixstave Laberty, and Narayan Menon & Bros., Commercial Road; all of Ootacamand.

1475. S. C, Morar.—To learn German language write to School of Modern Languages, Poona.

1476. M. N, Mirzapur.—For spare time work go through the New Idea columns of INDUSTRY.

1478. J. D. D, Seoni.—In silvering mirrors use pure silver nitrate when the defects will be remedied.

1479. M. S. Y, Nyaunglebin—Your ideas are impracticable.

1480. C. P. A. M, Annur.—For logwood extract enquire of S N. De, P. O Box 7851, Calcutta. Fustic may be supplied by Hansraj Vishram & Co, 13, David Joseph Lane, Calcutta. Hyparmic extract may be had of Smith Stanistreet & Co., Dalhousie Square, Calcutta. White tartar may be supplied by Bengal Chemical and Pharmaceutical Works, Ltd, 15, College Square and Calcutta Chemical Co, Panditia Road, Ballygunj; both of Calcutta.

1481. P. C. J, Hissar—It matters little whether you use sugar in powder form or in liquid. Electric engines may be bought of Alfred Herbert Ltd, 13, British Indian Street, Calcutta. Wire, etc., may be supplied by Mc. Lawrie & Co., 17, Ezra Street, Calcutta.

1486. S. M. M. J, Simla.—Tobacco for biris may be had of B. B. Pandey & Sons, Katni. E. I. Ry. and Moolji Sicka & Co, 51, Ezra Street, Calcutta.

1487. S. B, Calcutta—Wants to know the address of correspondence college of Homeopathy in U. S. A.

1488. K. K. D, Calcutta.—Recipes of taral also appeared in August 1924 issue. For hair oil you may consult the booklet on Hair Oil Manufacture published from this office.

1489. S. N. A., Kanauj City.—For tin boxes enquire of Calcutta Colour Printing and Hollow Wares Ltd., 243, Upper Circular Road, Calcutta. For German address write to Editor, Export and Import Review, 38-39 Krausenstrasse, Berlin, Germany

1492. G. S. K, Agra.—For blocks enquire of Fine Art Printing Syndicate, 147, Baranosi Ghose Street, Calcutta. Enquiries regarding registration may be referred to P. Lodge & Co., P. O. Box 6772, Calcutta

1493. L. A, Irinjalakuda.—Refer your query regarding tomato cultivation to the Director of Agriculture of your province. Addresses of catholic journals appeared in the last issue. Can supply "Merumpuzhu."

1494. G. K, Narsapur—For tin printing refer to No. 1489 above.

1496. B. S. R, Ganguly.—For husking machine enquire of Ghatak & Co, Rai Bahadur Road, Behala, Calcutta. For coconut milk extracting machine try Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta. For bell metal utensils write to Shah Bros., Khagra and J. K. and S. K. Paul & Co., Khagra; both of Murshidabad. Beautiful earthen toys are made at Krishnanagar in Nadia.

1497. C. T. C, Bombay.—Recipes of toilet powder and pomades will be found in September 1924 issue. Recipes of hair dyes appeared in January 1925 issue. No substitute of hydrogen peroxide is known

1498. M. P. M, Bombay—Process of preparing margarine appeared in the last issue.

1499. M. L. S, Jubbulpore.—Perubalsam smeared on furniture will keep off ants.

1500. A. D. F, Najibabad.—You may sell your butter at Calcutta. You may consult Dairy Farming in India by D. J. Megher and

THE SECRET OF SOAP MAKING.

It will teach you how to prepare at home coloured and scented Toilet Soap, Glycerine Soaps, Soaps like Sunlight Soap, Washing, Laundry and other useful soaps with the least trouble and expense. The author is a manufacturer for years and with success. Price Rs. 2 only. V. P. charges extra.

THE HINDUSTHAN SOAP WORKS,
Publishing Dept. No. 1,
P. O. Nowasahar, Jullundur.

R. E. Vanghan and Cow Keeping in India by Isa Tweed to be had Thacker Spink & Co., 3, Esplanade East, Calcutta. Dairy appliances may be bought of Jupiter Trading Agency, Mulji Jetha Market, Karachi. Can supply pure honey.

1502. V. R. J., Anavatti.—There is no such school known to us. You may however write to Oxford Correspondence College Ltd., St. Giles, Oxford, England.

1503. B. D. Mangalore.—Flours may be bought of Junna Flour Mills Co. Ltd., 2, Mount Road, Mazagaon, Bombay; Prince of Wales Flour Mill, Upper Duncan Road, Byculla, Bombay and Bansi Roller Flour Mills, Outside Raipur Gate, Ahmedabad. Sugar is manufactured by Cawnpore Sugar Works Ltd., 123/1, Halsey Road, Cawnpore and Rewa State Sugar and Oil Factory, Rewa.

1504. J. V. Vaso.—Write your enquiries in English.

1505. G. S. Kotah.—For particulars of the articles write direct to the advertisers.

1507. F. K. V. Andheri.—Folding cardboard boxes may be supplied by Ross Wilhelm, Cleferstrasse, 67, Barmen and Borchand Jul, Gruner Weg 110, Berlin; both of Germany. The following are some of the lithographers of Germany:—K. Blan, Neustadt, Eisenbanstrasse 51, Leipzig; M. Hyde, Querstrasse 15-17, Leipzig; G. Alfred Muller, Konigstrasse, Leipzig; Graht and Kaspar, Merkurstrasse 7, Hamburg; L. Klemich, Albrechstrasse 15, Dresden and Richar Spiegel G. m. b. H, Krautstrasse, 18, Berlin.

1509. J. M. B. A. Umreth.—For tickets and other particulars write to Grahams Trading Co. Ltd., 9, Clive Street, Nippon Yusen Kaisha, 2, 3, Clive Row and Java Bengal Line, F 3 Clive Bldgs; all of Calcutta.

SURE HIDDEN TREASURE.

Right-Hand "Dakshinayan" Shankh, A Right-Hand Conch-Shell, 4" & 5" long, for Three Thousand Only. If you want to prosper more and more in Wealth and Health obtain this rarely procurable and un-valuable Genuine article, as early to save disappointment. Write in Hindi, Gujarati, or English to T. Nath Shukla.

MIYAGAM-KARJAN, BARODA STATE.

1510. C. M. Tuticorin.—Soaps are manufactured by Calcutta Soap Works Ltd., 15, College Square, Calcutta; P. A. B. Punjab Soap Factory, 55/8, Canning Street, Calcutta; Indian Soap Co., 64/1, Machuabazar Street, Calcutta; Indian Industrial Development Co., 46, Tamarind Lane, Bombay; M. Siddeque, M. Ibrahim, Pulmithai, Delhi; Oriental Soap Factory, Goabagan, Calcutta; Shalimar Soap Factory, 23/2, Andul Road, Shalimar, Howrah and Bool Bool Soap Factory Ltd., 30/31, Johnston Road, Dacca. Toys are manufactured by Dwarikanath Malakar, Muktearpur, Rajshahi.

1511. L. S. K. Lalgudi.—For weighing machines write to Avery, Waterloo Street, Calcutta. For grinding machines enquire of John Fowler & Co. Ltd., P. O. Box 654, Bombay.

1512. H. P. L. S. Secunderabad.—For starting business with a small capital go through the New Idea Columns of INDUSTRY.

1513. S. M. N. C. Dhone.—Wants to be put in touch with suppliers of Brook Bond tea tins. Your other query is engaging attention of our expert.

1517. K. I. Olloor.—Recipes of safety matches will be found in Septemehr 1923 issue. Match Industry in India by Mr. K. C. Sen may be had of Bhawani Engineering and Trading Co., 122/1, Upper Circular Road, Calcutta.

1519. D. H. P. Chanda.—For selling your match machines and match chemicals advertise in the pages of INDUSTRY. Matches are manufactured by Amrit Match Factory, Bilaspur, Kotah; Zeo Match Factory, Rajgangpur, Chaibassa and Indian Match Works, Jagannathpur, Cocanada.

1520. G. D. G. C. Lahore.—Scientific American may be bought of Thacker Spink & Co., 3, Esplanade East, Calcutta.

1522. J. R. R. Delhi.—Glue may be bought of M. P. Gupta, Cawnpur. Try to secure flour locally. Your other queries being in the nature of an advertisement should not be published in these pages.

1523. N. N. D. Jhenidah.—For degrees write to Universal University, Allahabad. For rules and regulations of advocateship examination write to Registrar to the High Court, Cal-

cutta. For kerosene oil enquire of Standard Oil Co., of New York, 101/1, Clive Street, Calcutta. For technical books in Bengali enquire of Gurudas Chatterjee and Sons, 201, Cornwallis Street, Calcutta. For particulars of London City and Guilds Examination write to the Inspector of Technical Education, 40-A, Free School Street, Calcutta. Other enquiries are not in our line.

1524. A. C. S. B., Calicut.—Spectacles may be bought of Lawrence Mayo & Co., 16, Old Court House Corner; Stephens & Co., 275, Bow Bazar Street and James Murray & Co., Government Place; all of Calcutta.

1526. R. J. K., Uppada.—For manufacturing hair oils you may consult the booklet on Hair Oil Manufacture published from this office. Recipes of essences and other perfumeries will be found in September 1924, issue of INDUSTRY. Process of mercerising yarn appeared in July 1925 issue.

1527. M. R. A., Rajshahy.—Recipes given in July issue will produce fast colour. Annatto is "latkan" and kamela powder is "kamalguri" in Bengali. Latkan and kamalguri may be supplied by Madhab Chandra Daw, 4, Armenian Street, Calcutta.

1528. M. A. C., Hinganghat.—Please explain your requirement more clearly and elaborately.

1529. A. E. B., Colombo.—Essential oil of Kashmir bouquet may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta and D. G. Gore, Sayana Bldgs Loharchawl, Bombay.

1530. L. V. S., Salur.—You may consult Newspaper Press Directory published by C. Mitchell & Co. Ltd., Mitchell House, 1 and 2, Show Hill, Hallborn Viaduct, London E. C. 1.

1531. N. N. Baramulla.—Hides and skins are imported by H. Alexander & Co. Ltd., 44-46, Leadenhall Street, London E. C. 3, S. L. Cohn & Sohns, Watchstrasse 27-28 Bremen, Germany and F. E. Jones & Co., 95, Sath Street Boston, Massachusetts, U. S. A. For more addresses go through January 1924 issue of COMMERCIAL INDIA, the Aster Journal of INDUSTRY.

1532. J. L. F. P. S., Goa.—Match materials may be supplied by Calcutta Chemical Co.,

Panditia Road, Ballygunge, Calcutta. For the required machines try Oriental Machinery Supply Agency, 20/1, Lall Bazar Street, Calcutta. For addresses of match manufacturers vide No. 1519 above.

1533. H. S. Jhooty, Tokomaru-Bay, New Zealand.—We do not deal in any article, we only supply information to our constituents. Hair oils of various types may be supplied by B. K. Paul & Co., 1/3, Bonfields Lane, Calcutta.

1534. R. D. J., Almora.—Rubber balloons may be supplied by Ali Mohamed Akber Ali, 22/1, Lower Chitpur Road and K. A. E. Sadka, 7, Colootola Street; both of Calcutta. Toys and fancy goods may be bought of The Pioneer Toy Mart, 10, Old China Bazar Street and S. C. Bose & Sons., 81, Clive Street; both of Calcutta.

1535. C. M. Phulera.—Arbib S., faubourg St., Denis, 61, Paris France; Ley Rudolm, Zimmerstrasse, 77, Berlin S. W., Germany and Sieradzka & Co., 42E, 12th Street, New York City, U. S. A., deal in feathers. For selling heron's feather you may try Moti Ram Jearather, P. O. Basti Guzan, Dist. Jullundur. For disposing of peacock's feather you may enquire of The Indian Trading Co., Jaipur and Sri Ram Kamath & Co., 1, McLean Street, George Town, Madras.

1536. A. B. F., Agra.—An article on biscuit making appeared in February 1925 issue. For books on the subject enquire of Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

1537. M. J. S., Quetta.—Garden tools may be supplied by The Planters' Stores and Agency Co. Ltd., 11, Clive Street, Calcutta. For iron and brass ware enquire of Richardson and Gruddas, Byculla Iron Works, Bombay.

SERVICEABLE GOODS.

High Class Ready Made Swadeshi Clothes.

Madras Tassar Coat Rs. 4/- and Rs. 3/-; Suit Rs. 7/8 and Rs. 5/4; Twill Shirts Rs. 1/8; Jaffer Shirts Rs. 1/6; Warm Frocks As. -12/- 1/2 with order. We defy competition in Prices and Artistic Cutting.

MAHINDRAKAR BROS.,
Bombay No. 4 or 12 & Poona City.

1539. G. S. C. S, Arni.—For the required machines enquire of Textile Machinery and Stores & Co, 61, Apollo Street, Fort and H. Mehta & Co, 123, Esplanade Road, Fort; both of Bombay. Chemicals may be supplied by Calcutta Chemical Co, Panditia Road, Ballygunge and B. K. Paul & Co., 113, Bonfields Lane; both of Calcutta. Colouring ingredients may be supplied by Madhab Chandra Daw, 4, Armenian Street, Calcutta. Other recipes you require appear elsewhere in this issue. Silks are exported by Joakhin Nahapiet & Co, 10, Strand Road; K. Hairam & Co., 10A, Lindsay Street and Hossen Mamoojee, 22 Amratolla St, all of Calcutta.

1540. R. P, Ranchi.—Vide No. 1375.

1541. B. Y. J., Goa.—For Derby tickets enquire of Secretary, Royal Calcutta Turf Club, 13, Russel Street, Calcutta. Wants to buy empty lockets for inserting photoes.

1543. N. K. C. Calcutta.—Olive oil is not manufactured in India.

1544. H. C. J, Satna.—Complete address of Ralli Bros is 25 Finsbury Circus, London, E. C. and that of Greham & Co., is 88, Fenchurch St, London, E. C. 3.

1546. N. S, Madura.—There is no such book known to us. Massage requires no special training.

1547. G. L. M, Lahore.—Knitting machines may be bought of W. Brady & Co, 26, Strand Road, Calcutta. For textile machines refer to No. 1539 above.

1548. S. V. R. N, Ahwaz.—For industrial books enquire of Chakraverty Chatterjee & Co. Ltd, 15, College Square and Thacker Spink & Co., 3, Esplanade East; both of Calcutta.

1549. M. H. S, Quetta.—Soda water requisites may be supplied by 'Aminchand Mehra & Sons, 34, Armenian Street, Calcutta; Little

& Co., 3, Grant Lane, Calcutta and Vitaldas Karsondas, 364, Upper Duncan Road, Two Tanks, Bombay No. 8. Hardware may be bought of Bombay Tube and Hardware Mart, 26, Nagdevi Street and G. M. Desai & Co., 253-257, Nagdevi Street; both of Bombay.

1550 S. T. S., Sambaroil.—Your enquiry is not in our line.

1551. B. R. K, Bhow.—For securing agency go through the Sale and Exchange pages of INDUSTRY.

1552. Q A. R, Gurat.—Rubber stamps are manufactured by B. N. Byack, 111, Ramchand Ghose's Lane, P.O. Beadon Street Calcutta.

1554. R B, Nagpur.—Cantharidine is a preparation from fly cantharides a kind of Spanish insect of golden colour. If added in proper quantities this prevents the falling of hair. For particulars you are referred to Hair Oil Manufacture published from this office. Embelic myrobalans commonly known as amla possess the property of turning gray hair black on repeated application of their extract. Use of amlas is made in the preparation of indigenous hair dyes and hence you may see if addition of amla extract to the hair oil gives the desired result. At present German currency has been stabilized and renten mark equals 1 s.

1555. V. J. P, Bagalkot.—For ink pots enquire of Calcutta Glass and Silicate Works Ltd, Belgachia, Calcutta and S. K. Dey, 124, Shoba Bazar Street, Calcutta. Corks may be supplied by P. S. Dutt & Bros., 8, Ezra Street, Calcutta. Cardboard boxes may be bought of H. L. Sett & Sons, 8 Nilmoncy Mitter Street and Bengal Cardboard Box Manufacturing Co., 641, Machua Bazar Street, Calcutta.

1556. M. Y, Moulmeingyun.—For securing a suitable service go through the situation vacant columns of dailies and apply to the respective firms mentioning your qualification.

ACCOUNTANCY.

by post

in Rs. 6 only.

Apply prospectus.

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A Gujrathi Book.

We have received a book setting forth the commercial experience of Bombay in Gujrathi language from Messrs. Mulji Nathji Kothari. It will prove immensely valuable to the Gujrathi-knowing public who are interested in industry and trade in the Gateway of India. Enquiries should be made of Messrs. B. Dattaram & Co, 2-40, Sir Bhalchand's Building, Grant Road, Bombay.

Automatic Warping Machine.

Now that there is widespread movement for the revival of spinning and weaving we are glad to note that an automatic warping machine for handlooms has been patented which is calculated to considerably help the weavers in their preparatory operation. The special features claimed for it may be indicated briefly: (1) the yarns form a complete base by the simple turning of the reel, (2) the numbers of the counts are measured automatically, (3) ten threads are worked at a time, (4) the warping stops automatically even if a single count is broken, (5) the warp may be of any breadth and length. We are satisfied with the model which have been shown to us. For further particulars our readers are referred to the patentee Babu Sarat Chandra Ray Chaudhury, 5-C, Nebubagan Lane, Bagbazar, Calcutta.

A Progressive Library.

The fifty-second annual report of the Carmichael Library, Benares, shows satisfactory progress. An institution which has grown steadily for half a century deserves the support of all.

Patent Medicines.

Among the many patent medicines prepared by Bharat Bhushan Company, Jativena, Ajmer Gate, Delhi we have received samples of Rog Haran, Krishna Churan, Naiti Rakshak Surma, Hair Destroyer, etc.

Book on Health.

Swasthya Siksha, in Hindi. By Mr. Dayasankar Pathak, Medalist, Jaypur, Price Re 1.

In these days of physical degeneration we welcome the publication of the above book on health which will prove beneficial to the Hindi-knowing readers of INDUSTRY. The subject matter is well arranged and treated methodically. Besides dissertation on hygiene, bath, food, etc. there are instructions on exercise, massage, etc.

Citronella Oil.

Two kinds of citronella oil are distilled by Mr. A. W. Wijesinhe, Wanwa Walduewa, Beliatta, Ceylon; one, pale and the other green. The oil has many useful application in medicines and therefore enjoys a wide market both here and abroad. Those of our readers who wish either to use or deal in this oil may enquire at the above address.

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Yoco Book Polish is a transparent germicidal preparation to protect and polish the books at the same time. This useful article can also be used as a preservative for records, documents, etc in a library against bookworms, white ants, moths and other insects. It may be had of Messrs. Mahomed Jivabhoy & Co., Nizam Street, Bombay 9.

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1625. Saiyid Zahiruddin Hyder, Shahabad Collectorate, Arrah.—A young ambitious but poor man wants to be an apprentice to an accounting and book keeping school.

OCTOBER ISSUE OF INDUSTRY.

(In the Press)

The October issue of INDUSTRY which will appear in the first week of October will contain articles on Date Sugar, Cheese Making, Tape Making, etc, in addition to the usual features such as Small Trades, Formulas, Topics, etc, etc. Any friend of our subscribers may get a copy as sample on application to the Manager, Industry, Shambazar, Calcutta

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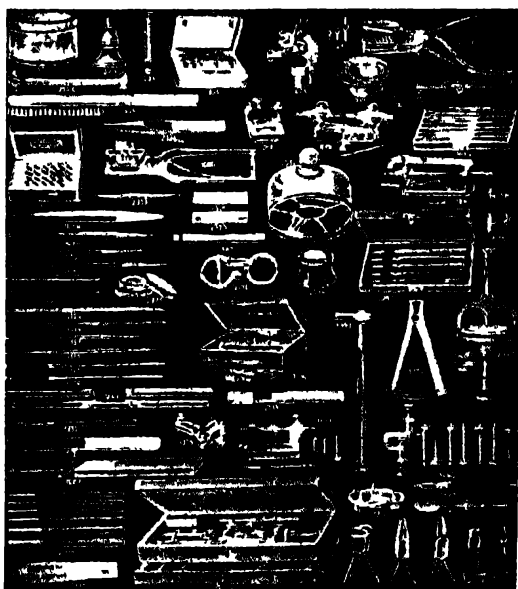
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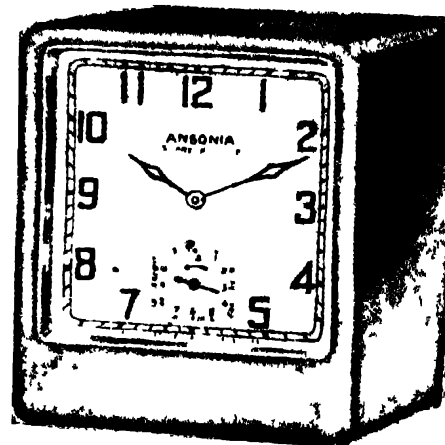
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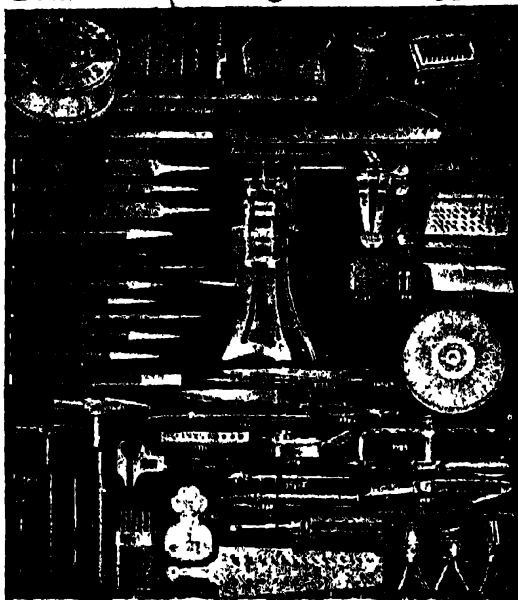
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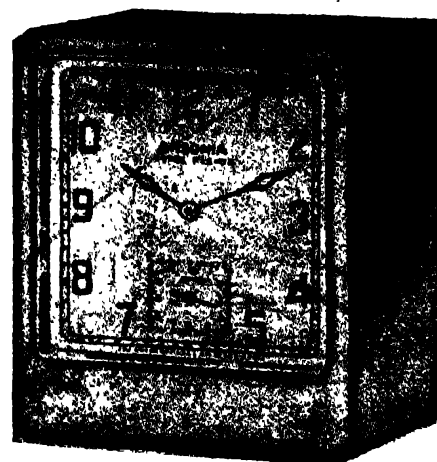
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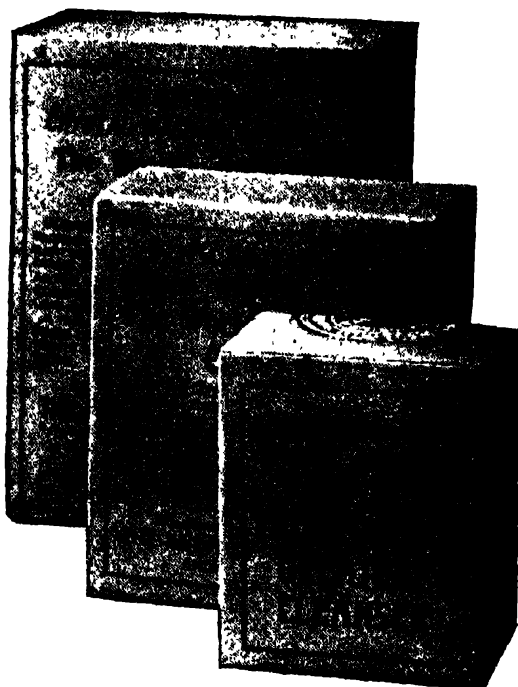
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Industry

A JOURNAL OF TECHNOLOGY, HANDICRAFTS & COMMERCE.

VOL. XVI.

CALCUTTA, OCTOBER, 1925.

NO. 187.

DUSSERAH IS OVER!

INDUSTRY sends you its hearty greetings of the season.

Yes, the season that is meant to enliven every heart, encourage every soul for everlasting goodwill and prosperity.

The season that is intended to bridge over every chasm of enmity and embitterness, to bring in sunshine of life and joy.

The message of the season is how to make your country and your people prosperous. It sends out new hopes, new aspirations, renewed vigour and determination.

INDUSTRY carries the message to the home of every one of its readers and expects everyone of them to carry the message to the home of his friends and neighbours with the same vigorous determination, with the same hopeful buoyancy to see the country and her people more prosperous next Dusserah than this, as **INDUSTRY** is determined.

Opportunity extends her right hand this season; will you fail to grasp it?

A SELF-HELPING VILLAGE.

ON THE outskirts of Calcutta there is a small village inhabited by a very small number of people, about fifty or sixty *Bhadraloue* families and about double that number of peasant families. The small village once saw prosperous days when it was inhabited by a prosperous *zaminder* and other men of rather high life. But its days have gone—the *Bhadraloue* heads of families clerk away their lives in the mercantile offices of Calcutta and the peasant classes pass their days either as workmen in the mills and factory areas or toil in the field to produce the wealth that needs and demands more intelligent and busier brains.

It was a prosperous village even forty years back when healthful boys roamed its alleys and marches and when contented inhabitants passed their evening in pleasant talks and popular enjoyment, when the upper classes were friends and guides of the artisans and peasants to whom the unnatural life in factories and emasculating association of revelry were unknown.

Time changed all these—not a long time, but only a few years, worked strenuously over the decay when the tall buildings rendered to peep their unplastered faces over the growing shades of jungle shrubs. The inter-village pleasures and healthful freaks of village boys rendered conspicuous more by their absence and the village quarrels over insignificant niceties were casting bigger shadows of gloom when a few of the villagers—four only in number—inconspicuous

people, began to consider over the situation. It was only in 1915 that they, these four only formed into an association to improve their common condition, to help themselves in case of their need by common arrangement. They formed into an association with no patriotic object but only to help friends in times of need—not a very inspiring object indeed.

They fixed their subscription at Re 1 only monthly and began to accumulate it in silence and unostentatiously till such a time when their accumulated fund would enable them to help themselves. The members began to grow slowly but steadily, their fund also began to grow when after a few years they had a decent collection among themselves—a few hundred rupees. They have now only 45 members, nearly all the heads of *Bhadraloue* families. They help their members with a timely loan, they assist the poor and the distressed in their difficulties by charity or loan as the condition may be, they help the local school and make every effort to establish among the members fellow-feeling and friendship broadbased on the goodwill of a common unity.

They established themselves as an Insurance Company also inasmuch as the nominee of a member on his death is entitled to get 90 per cent. of the subscriptions he paid. And as a benefit during life time a member is also entitled to draw 10 per cent. of his subscribed amount at the end of every tenth year.

We do not propose to go into any detail of the scheme worked by this village association to help themselves. We only want to put to our readers that every village in this vast country can work out their own salvation on this line without help from the Government or from any outside fund. You must help yourself patiently and ungrudgingly if you want to survive the rancours of time and you must remember that no one can help you unless you help yourself. Our villages are producers of wealth and you must be prepared to produce wealth in newer, better ways for the common good of the village people—not to clash with the old ways, not to raid upon them with begging bowls.

Leave off the country, leave off the towns, leave off the leaders to look after themselves: You must look to the village to earn for the village not money but food and when the villages are self-supporting, the country would not need to be supported by exploiting foreign labour and ever-growing foreign capital and merchandise.

Let in every village any number of aspiring villagers form into unions. You can commence with any number, five, ten, twenty, thirty—numbers need not count but there must be enthusiastic fire in every heart. You must collect your subscription one rupee each. Never take donation, never take to charity, never seek outside help. As soon as you are able to collect a decent amount yourself you can commence work. In the meanwhile equip yourself with suitable information, make a list of all waste land

in your village, mark out the land which can be taken over by the village, make it be made produceable more or less, particularly make a list of all ponds and tanks that can be similarly available. Make a study of the produceable occupation in your village not clashing with the existing ones. These may be horticulture, floriculture, pisciculture, etc. As soon as a little fund is collected make a fixed deposit of a portion of it say in a post office. Take one of the least expendable waste land or waste pond on lease. Attempt should be made to pay the rent in kind from the produce. If you take a pond spend some money to excavate it and raise the sides, make such arrangement that even during the scantiest rains it is filled up and you suffer no shortage of water. Cultivate fish in the water and suitable fruit trees on the sides. Distribute a portion of the fish among the members and sell the remaining. This will be a regular and never-failing source of income to the union. Extend your operation as the fund grows until there is no waste land and waste labour. It may take ten or even twenty years but after this time your village would be model of health and plenty. Let there be plenty of food, plenty of milk and no waste land and in no time you will find there is no waste of human life, human labour, human enjoyment and health.

Help yourself and you need no help from outside.

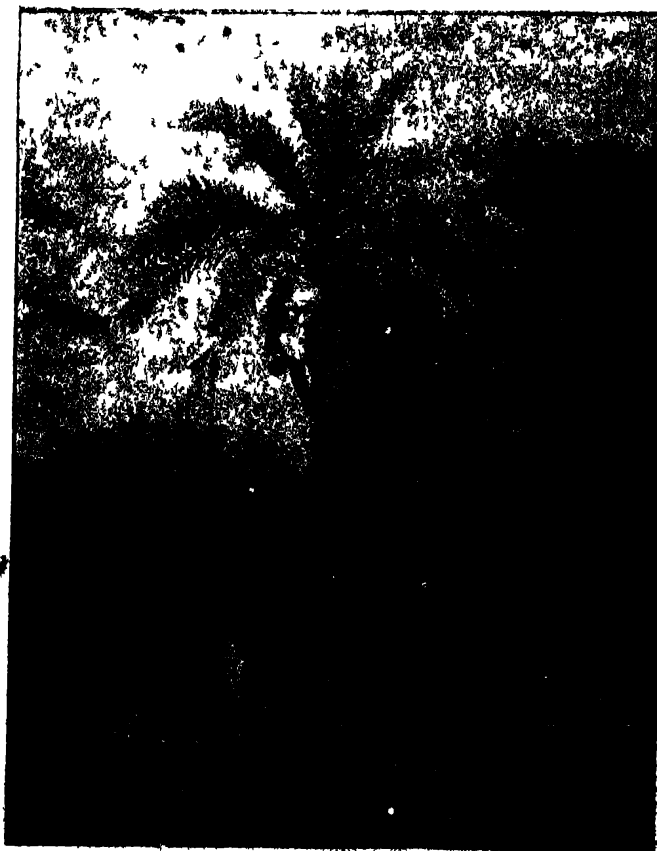
We invite our village readers to send us description of their villages to enable us to discuss the cases individually.

DATE SUGAR MANUFACTURE.

THE process of tapping begins only when the date tree is ripe and then it is continued each year thereafter. When the rainy season has completely passed and there is no fear of rain, the cultivator cuts off the lateral leaves for one half of the circumference, and thus leaves bare a surface measuring about ten or twelve inches each way. After the tree has remained for a few days thus exposed, the tapping is performed by making a cut into this exposed surface, in the shape of a very broad V, about 3 inches across, and $\frac{1}{4}$ or $\frac{1}{2}$ inch deep. Then the surface inside the angle of the V, is cut down so that a triangular surface is cut into the tree. From this surface exudation of the sap takes place, and caught by the sides of the V, it runs down to the angle, where a bamboo of the size of the lead-pencil is inserted into the tree to catch the dropping sap and carry it out as by a spout. The tapping is arranged throughout the season, by periods of six days each. On the first evening a cut is made as just described and the juice is allowed to run during the night.

The juice so flowing is the strongest and best, and is called *Jiran* juice. In the morning the juice collected in a pot hanging beneath the bamboo spout is removed and the heat of the sun causes the exuding juice to ferment over and shut up the pores in the tree. So in the evening the new cut is made,

not merely so deep as the last, but rather a mere paring and for the second night the juice is allowed to run. This juice is termed *do-kat* and is not quite so abundant or so good as the *jiran*. The third night no new cutting is made but the exuding surface is merely made quite clean, and juice which runs this third night is called *Jharua*. It is less abundant and less rich than the *do-kat*, and towards the end of the season when it is getting hot it is even unfit for sugar manufacture, the *gur* made from it (and also from day *Jharua*) being sold simply as "dropping". These three nights are the periods of activity in the trees, and



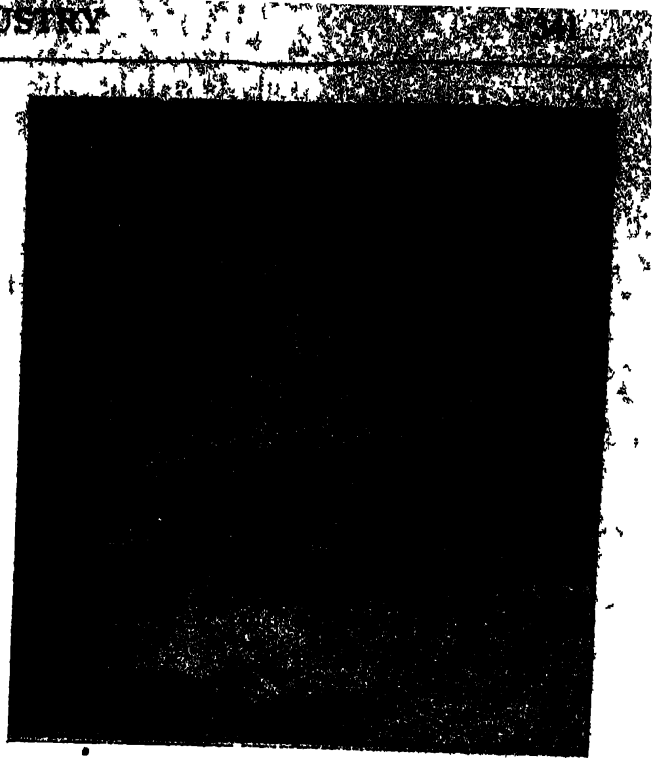
1. TAPPING OF DATE PALM.

after these three, it is allowed to remain for three nights at rest, when the same process again begins.

So much for tapping the juice. The next process is the boiling. Without boiling, the juice speedily ferments and becomes useless; but once boiled down into *gur*, it may be kept for very long periods. The juice is therefore boiled at once in large pots placed on a perforated dome, beneath which strong wood fire is kept burning, the pared leaves of the tree being used among other fuel. The juice, which was at first brilliant and limpid, becomes now a dark brown, half viscid, half solid mass, which is called *gur* (molasses) and when it is still warm, it is easily poured from the boiling pan into the earthen pots (small *gharras*) in which it is ordinarily kept.

The *gur* is next manufactured into sugar. There are general methods of refining, and two or three sorts of sugar produced. Of these *Dhulia* is a soft, moist, non-granular, powdery sugar, used chiefly in the manufacture of sweetmeats.

The pots of *gur* received by the refiner are broken up and the *gur* tumbled out into baskets, which hold about a maund each and are about fifteen inches deep; the surface is beaten down so as to be pretty level and the baskets are placed over open pans. Left thus for eight days, the molasses passes through the basket, dropping into the open pan beneath and leaving the more solid part of the *gur*, namely, the sugar, in the basket. *Gur*, in fact, is a mixture of sugar and molasses, and the object of the refining is to drive off the molasses



2. MAKING OF JAGGERY.

which gives the dark colours to the *gur*.

The eight days' standing allows a great deal of the molasses to drop out, but not nearly enough, and to carry the process further, a certain river weed, called *shyala*, is placed on the baskets so as to rest on the top of the sugar. The effect of the weed is to keep up a continued moisture and this moisture, descending through the sugar, carries the molasses with it, leaving the sugar comparatively white and free from molasses.

After eight days' exposure with *syala* leaves, almost four inches are cut off and *syala* applied on the newly exposed surface. This and another application will be sufficient to purify the whole mass.

The sugar thus collected is moist and it is therefore put out to dry in the sun, being just dropped up so as to prevent it caking. When dried it is fair,

lumpy, raw sugar, and it weighs about 30 per cent. of the original mass, the rest of the *gur* having passed off in molasses.

The sugar produced by the method just described is called *dhulya*—a soft yellowish sugar. It can never be clean because of the process used. What is known as “*pucca*” sugar is a much cleaner and more permanent article. It has also a granular structure, which the *dhulya* has not.

In this process the *gur* is first cast upon flat platforms, and as much of the molasses as then flows off is collected as first droppings. The rest is collected, put into sacks and squeezed, and a great deal of the molasses is thus separated out. The sugar which remains behind is then boiled with water in large open pans, and as it boils all scum is taken off. It is then strained and boiled a second time and left to cool in flat basins, when cool it is already sugar of a rough sort and now *syala* leaves are put over it, and it is left to drop. The result is good white sugar.

The first droppings in these processes yield *chitya gur* which is used for mixing with tobacco.

COALTAR.

COALTAR is formed by a destructive distillation of coal at a high temperature, usually a bright red-heat, or beyond. Although it contains fatty hydrides, they are chiefly liquid ones and not paraffin. Among its constituents are aromatic hydrides, their alcohols and naphthalin. Chrysene

occurs both in the low and high temperature oils.

The clay retort employed for the preparation of coaltar is semi-circular in section, having a diameter of 18 inches, a length of 9 feet, and a thickness of $2\frac{1}{2}$ inches. It is flanged in front, so as to receive an iron door which is tightened with wet clay, and pressed on by a screw. Five of such retorts can be conveniently heated together; the best working temperature being about 1,150. The charge is sufficient to fill them to about three-fourths of their capacity. The residual cake is drawn and quenched every three hours to eight hours. By means of an exhausting apparatus, the distillation is kept in process at an average internal pressure of about half an inch of water. Some graphite carbon is always formed, and remains strongly adhering to the inside of the retort.

The products of destructive distillation leave the retort at about 480 deg. and after travelling rather more than 20 feet, cool down to about 100 deg. All the products, after leaving the retort, pass into a hydraulic main; here the liquid products are deposited, and thereby separated from the gaseous ones. The bent pipe from the retort dips slightly under the liquid in the main, into which no air consequently passes when the retort is open.

Coal yields from 6—15 per cent. of liquor, from 3—6 per cent. of tar and about 50—70 per cent. of coke: the remainder represents the yield of gas and the working loss.

Tar is treated with steam to remove light naphtha, or crude "benzol." The stills hold from 500 to 4,000 gallons, and are horizontal cylinders. The steam brings over about 5—10 per cent. at most of light naphtha and some ammoniacal water, which is treated like the other "liquor". The residue of the distillation is heated by fire to about 200 deg., when most of the heavy oil comes over, and afterwards to over 300 deg. The residual pitch, which amounts to 30—50—70 per cent. of the tar, is after several hours' cooling run off into moulds. It is generally utilised for "asphalt", by mixture with about four times its weight of sand, chalk, or other inert material; or for "patent fuel" by moulding with four parts of coal dust or similar material.

The light naphtha is run off the "liquor" beneath it and churned with 5 to 12 per cent. sulphuric acid and afterwards with about 2 per cent. of caustic soda. It is advisable to redistil the crude naphtha before submitting it to this chemical treatment. The residues of this second distillation, when mixed with lime, yields a lubricating "grease". Finally, the purified naphtha is distilled by steam. About half of it consists of 50 per cent. benzol (to 140 deg. C.) and the remainder (to 170 deg. C.) constitutes "solvent" benzol the later fractions yielding some "burning naphtha" "90 per cent. benzol" boils at and below 100 deg.

The heavy or "dead" oil may be used, as such, for preserving or creosoting timber; for which purpose portions boiling above 31 deg. are better adapted than the more volatile phenols.

The oil is more commonly distilled. The earlier portions of the distillate (150 deg. to 200 deg.) contain impure phenol; the following portions (200 deg. to 212 deg.) are rich in naphthalin; the next fraction (212 deg. to 270 deg.) contains creasols; and the last (to 360 deg.) yields crystals of anthracene on cooling. Anthracene is the source of the artificial alizarin. The treatment of the phenol fraction is the object of a special industry, viz., that of carbolic acid.

Instead of passing steam through the retort in the first distillation of coal-tar, direct heat alone is very frequently applied, the water naturally suspended in the tar providing for some time the necessary steam. In this method the gases at first extricated are sometimes passed through a purifier, and afterwards burned. The first runnings from the still are very light oils, almost free from phenol, and accompanied by ammoniacal water. As soon as the latter has completely passed over, a considerable access of heat is necessarily required to volatilize unaided, any further portion of the tar; so that this period of the distillation is usually very well marked. Light oils of the naphtha class are distilled up to 170 deg. at least; impure phenol and naphthalin to a point exceeding 220 deg. creasols to 270 deg. and anthracene oil to 360 deg. The residue is pitch. The average result is as follows:—

First runnings 2.5. •

Light oils 5.0.

Creosote oils, naphthalin and phenol 27.5.

Anthracene oil 10.0.

Pitch 55.0.

ON THE NATURE OF CLAYS.

THE term clay is applied to certain hydrous silicates of alumina, derived for the most part, from the decomposition of felspathic rocks, and which are generally rendered impure by the admixture of other substances. Economically, the term is applied to any finely divided mineral matter, which becomes plastic on being wetted and retains its shape when moulded or pressed into any particular form. Lime, magnesia, oxide of iron, with some other colouring metallic oxides, are occasionally present in small quantities in certain natural clays; when iron is present, the clay burns red.

(1) They are readily diffusible through water, and are capable of forming with it a plastic, ductile mass, which may be kneaded by hand into any shape. This plasticity exists, however, in very different degrees in the different clays.

(2) They concrete into hard mass upon being dried, and assume, upon exposure to the heat of ignition, a degree of hardness sometimes as great as to give spark by collision with hardened steel. In this state they are no longer plastic with water, even when pluvierised. Tolerably pure clays, though infusible in the furnace, become readily so by the admixture of lime, iron, manganese, etc.

(2) All clays, even when previously freed from moisture, shrink in the fire by virtue of the reciprocal affinity of their particles; they are very absorbent of water in their dry state, and adhere strongly to the tongue.

(4) Ochrey, impure clays emit a disagreeable earthy smell when breathed upon; the odour is indeed observable to a greater or less extent in all clays.

Clays are classified into:—

- (a) Fire-clays.
- (b) Fusible.
- (c) Effervescing from the presence of chalk.
- (d) Ochery.

VARIETIES OF CLAYS.

The following are the chief varieties of clay usually recognised:—

(1) **SLATE CLAY.** Its colour is grey or greyish yellow; massive dull, or glimmering from admixture of particles of mica. Fracture slaty, approaching sometimes earthy. Fragments tabular; soft, ductile, and easily broken; adheres to the tongue, and breaks down in water. Slate clay is ground and reduced into a paste with water for making fire-bricks; for which purpose it should be as free as possible from lime and iron.

(2) **FIRE-CLAY.** It is largely employed in the manufacture of fire-bricks, glass-house pots, etc.

(3) **COMMON CLAY OR LOAM.** This is an impure coarse pottery clay, mixed with iron ochre, and occasionally with mica. It has many of the external characters of plastic clay. It is soft to the touch, and forms with water a somewhat tenacious paste; but is in general less compact, more friable than the plastic clays, which are more readily diffusible in water. It does not possess the property of acquiring in water that

commencement of translucency which the purer clays exhibit. Although soft to the touch, the common clay wants unctuousity, properly so called. This clay is fusible at a strong heat in consequence of the iron and lime which it contains. It is employed in the manufacture of bricks, tiles, and coarse pottery ware.

(4) POTTERS' CLAY OR PIPE CLAY.

This species is compact, soft, or even unctuous to the touch and polishes with the pressure of the finger; it forms, with water, a tenacious, very ductile, and somewhat translucent paste. It is infusible in a porcelain kiln, but assumes in it a degree of hardness. It is also called pipe-clay. Good plastic clay remains white, or if grey before, becomes white in the porcelain kiln. Plastic clay is employed as fire-clay for making the bungs or seggars, or coarse earthenware cases, in which ware is fired.

(5) PORCELAIN CLAY OR KAOLIN EARTH.

Kaolin is the name given by the Chinese to the fine white clay with which they fabricate the biscuit of their porcelains. This is the purest known form of clay and contains silica 46.3; alumina 39.8, water 13.9 per cent. Ordinary massive kaolin, examined under the microscope, always exhibits certain six-sided scales characteristic of the mineral species called kaolinite.

The kaolins possess very characteristic properties. They are friable in the hand, meagre to the touch and with difficulty form a paste with water. When freed from the coarse and evidently foreign particles interspersed through them, they are absolutely in-

fusible in the porcelain kiln, and retain their white colour unaltered. They harden with heat like other clays, and perhaps in a greater degree, but they do not acquire an equal condensation or solidity at least when they are perfectly pure. Most of the kaolin clays contain some spangles of mica, which betray their origin from granite.

This origin may be regarded as one of their most distinctive features. Almost all the porcelain clays are evidently derived from the felspars contained in granite, principally in these rocks of felspar and quartz called "Graphic Granite". Hence they are to be found only in primitive mountain districts, among banks or blocks of granite, forming seams often of very considerable thickness. In the same bed quartz and mica occur while some portions of the kaolin retain the external form of felspar.

CONTRACTION IN BURNING.

The amount of contraction in burning, due partly to the loss of water of combination and of the carbonic acid in the carbonates, when present, and to the ignition of any carbonaceous matter contained in the clays, but more specially to the drawing together of the particles in the production of vitreous silicates, is very variable and depends both on the chemical and mechanical composition of clays. The presence of the alkalis and iron tends to complete vitrification, which is always accompanied by a great amount of contraction, and the production of a glass-like body with a bright conchoidal fracture. On the other hand, in clays containing much free silica or even sili-

cate of alumina without the accompaniment of the fluxing alkalis, a small amount of contraction takes place and an open porous body is the result.

The amount of contraction is not less due to the state of mechanical subdivision of the constituent particles. Clays in a coarse state of subdivision and containing a large proportion of gritty matter, especially of silicious sand, invariably contract less in burning than those of smooth and fine texture, in which the constituents are in an impalpable state of subdivision; this will be at once seen by a comparison of the amount of contraction of slabs composed of the coarse clay in its natural state with those moulded from the clays from which the coarse matter in the native clay has been removed.

Few clays produce a perfectly vitreous and unabsorbent body. Some burnt slabs approach to a glassy texture, while others are so highly silicious and coarse in grain as to be held together by a very slight cohesion. These are in the burnt state open and spongy, and have undergone but little contraction in the kiln. The great majority of clays are intermediate in character between these two extremes, and after the process of burning, form a compact but slightly porous body, subject to a moderate amount of contraction, and are available for general pottery purposes.

THE COLOURING MATTER OF CLAYS.

No native clay is entirely free from the presence of iron which occurs in aluminous earths in various proportions and states of combination. Iron in the white and grey tertiary clays occurs

principally in forms of grey carbonate of protoxide, generally in association with finely divided carbonaceous matter in proportion varying from mere trace up to 4 or 5 per cent.

Iron, which is so prejudicial in clays employed for white pottery, is an essential colouring matter in those used in the manufacture of terra cotta, encaustic tiles, bricks, and all common pottery.

These may be considered separately as:

- (a) Grey clays.
- (b) Yellow clays.
- (c) Red clays.

(a) Grey clays, so largely developed as "clunches" and fire-clays in the carbonaceous beds of the coal measures, owe their colour, in addition to the presence of carbonaceous matter, to carbonate of protoxide of iron in a fine state of subdivision, and occasionally to the presence of finely divided pyrites or bisulphide of iron.

(b) Yellow clays are coloured by hydrous sesquioxide of iron, and generally occur as surface deposits, or where red and grey clays have been subject to weathering, as on exposed surfaces or along lines of jointing. Yellow clays have also been derived from red beds by the red anhydrous sesquioxide and the lower hydrate receiving water of combination.

(c) Red clays and marls, derive their colour from the presence of anhydrous sesquioxide and the lower hydrous oxide of iron which occur in variable proportions, and are generally associated with small quantities of iron in other state of combination, the colour of which the red oxide obscures.

THE COLOURING OF BURNT CLAYS.

The colour of burnt ferruginous clays is entirely due to the amount of iron present irrespective of its previous state of combination, but subject to certain conditions in the general composition of the clay. The action of the kiln, with some exceptions referred to below, is uniform on nearly every state of combination in which the iron occurs; viz., to reduce it to anhydrous sesquioxide associated as silicates in a more or less intimate state of combination with the other silicates developed in the process of burning.

Yellow clays coloured with hydrous sesquioxide (e.g., yellow ochre) and red clays coloured with anhydrous sesquioxide and the lower hydrates merely lose their water of combination and become bright brick reds (e.g. red ochre and Venetian red).

Grey clays containing less than 1 or $1\frac{1}{2}$ per cent. of iron change in the kiln to various shades of cream colour and buff, whilst those containing from 2 to 10 or 12 per cent. range in colour from yellowish fawn to dark reds; from 3 to 4 per cent. of iron produces in the kiln the bright red bodies used in the manufacture of red terra cotta, encaustic tiles, red building bricks, etc.

The brightest shades of red and buff are, however, produced with but a partial vitrification of the body: At a heat sufficient to ensure its complete vitrification a further change of colour takes place. The bright buff shades are changed to neutral greys, and the reds to a slaty-greyish-black.

Grey clays containing finely divided pyrites or bisulphide of iron are also converted by the kiln into bright reds, the sulphur being driven off leaving terra cotta charged with the red anhydrous sesquioxide.

CHEESE MAKING.

THE best time to make cheese is immediately after milking. The milk should first be poured from one vessel to another in some locality where the air is pure and fresh, raising the vessel from which the milk is poured high, so that air can pass through the milk and carry off the animal odour. The milk is then poured into a vat and coloured if desired. A teaspoonful of cheese colour to sixteen gallons of milk may be used. At this point the milk is heated, if necessary, to make certain it has a temperature of 86 to 89 degrees.

The rennet extract at the rate of one ounce to a hundred pounds or twelve gallons of milk is now added. It should first have been diluted in about ten times its bulk of cold water before adding. It must be well stirred into the milk. The milk should begin to curdle in from ten to twelve minutes.

Great care should be taken not to have the milk at a temperature below 86 degrees when the rennet is put in, and it should not be above 90 degrees afterward. The milk must now be stirred gently until the curd is firm enough to cut. For cutting, regular cheese knives are best.

After the cutting is finished the curd is gently stirred by hand for about three minutes, then heated slowly to 93 to 100 degrees, constantly stirring gently while the curd is being heated; the curd is kept at this temperature for about forty minutes. As soon as the curd is sufficiently cooked the whey is drawn off and the cheese mould is filled by taking a double handful at a time and pressing gently into the mould, continuing until the mould is full and well rounded up.

The cheese curd is then taken out of the mould and turned upside down and replaced. The cover is put on and the

whole is put into the press. The cheese remains a few hours in the press and is then taken out and dressed.

To dress a cheese it is first put into warm water and a piece of cheesecloth about six inches wide and long enough to go around the cheese is wrapped smoothly around the cheese and folded down over the sides; then a cap is put on each side. The cheese is then returned to the mould. Both are put under the press. The cheese is left in the press for about twelve hours, then taken out and salted.

The cheese may be either dry-salted or brine-salted. Brine-salting is the better way. A solution of salt and water is made as strong as it can possibly be made; the cheese is put in this and salt is sprinkled on the exposed surface. The cheese is left in this for forty-eight hours, being turned every twelve hours. When salted sufficiently long the cheese should be removed from the brine, stripped of cloths wiped dry and laid on a cellar shelf. After about two or three days, when the cheese has become fairly dry on the outside, it should be dipped in hot paraffin. This is done to kill all mould spoils that have lodged on the moist surface and also to keep the cheese moist by preventing the evaporation of water.

The temperature best adopted for curing is from 55 to 65 degrees. The cheese will be ready for use in from two to four months. The lighter the cheese is salted the sooner will it be ready for use, and the more the curd is cooked the slower it will be in ripening and the longer it will keep.

HORTICULTURE.

(By a Practical Expert.)

HORTICULTURE is an interesting occupation practised both for pleasure and for profit. The first consideration is soil and how to manure it. Grafting is one of the most important branches of horticulture and for success great care must be bestowed in all its processes. The tender plants and grafts should be reared carefully. They should be provided with ample food, viz., manure, water and light. They must be protected against animals and barriers may be erected for the purpose. Tender plants, should be watered regularly every morning and evening but by no means sprinkle water when the sun is high in the sky. This will cause great injury to the plants. The soil where the plant is to be planted must be cleared of all stones, bricks and gritty matter and manure may be added from time to time. While watering, see that water stands at the foot of the plant.

In grafting only trees or plants bearing excellent fruits and flowers should be selected. For otherwise good results cannot be attained. Moreover, for better results healthy knotty branches are to be chosen. This strengthens the graft.

Another vexing subject to the horticulturists is the non-fructification of trees. Some trees bear neither fruits nor flowers when they grow up and if they yield fruits or flowers, they are in very small quantities. A few recipes are given for the purpose.

PREPARING EARTH.

Slimy earth and cowdung are taken in equal proportions and are mixed to-

gether intimately. To the mass then add a quarter of its weight of castor cake in a powdered condition and knead well with water. This earth is required much for grafting purposes.

MANURING EARTH.

First dig a hole about 2 to 3 cubits in length and breadth and proportionately deep. Into this put dried leaves of trees, cowdung, bits of straw and castor cake in small pieces and cover these over with loamy earth. Then pour in water over the cavity such that some water stands on the hole. Water is to be added from time to time. After a month the whole is taken out and kneaded well. This earth serves the purpose of manure and is much employed in horticulture.

GRAFTING.

MANGO.

To rear grafts first of all the branches of mango trees are examined. Select one with a good number of knots. Now surround this with a lump of earth as prepared above, about one-fourth seer in weight. Wrap this over with a piece of cloth, then tie with a piece of gunny cloth. Now make a device to water the spot in the following manner. Just over the spot where the earth is tied, fasten an earthen vessel with a small hole underneath on a separate branch of the tree. Fill this with water and then water will drop on the spot drop by drop. The vessel is to be refilled when water has fallen off. The watering should be continued for 15 days. The graft will then be ready for planting.

JACK FRUIT, LEECHIE, STAR APPLE, GUAVA, PEACH, BERRY, ALMOND, ETC.

A healthy twig is selected and is surrounded about its knot with prepared earth. Tie this first with a piece of gunny cloth, then with blanket. Then arrange a watering device as described above.

After 20 to 30 days the branch is cut off from below the earth covered spot. Then select a site, dig up about 1 cubit and free the soil of all bricks, pebbles, etc. Put in some manuring earth, and then plant the graft there. Water twice daily.

ROSE.

A healthy, stout and knotty branch of a rose plant is selected for grafting. Surround the knotty joint with the prepared earth. Then bend the branch and stretch it on the ground by tying a heavy weight. The graft should be watered twice daily. After a fortnight sever the twig just above the spot where earth is tied and plant this in a good place. The plant from which the graft is made will yield larger number of flowers, all bigger in size.

ROSE.

In some cases two twigs are to be tied together to rear grafts. The following is the method. The lower part of the branch of an ordinary rose and the end of a healthy branch of a good rose plant are to be tied together. The two parts are to be suitably cut for grafting and joined together and tied over by thin bark of trees or by fine thread. Then the joint is to be cemented by the prepared earth, which will encircle it altogether. After a fortnight the branch of the good rose plant is to be cut at a place below the joint and the branch of the ordinary rose it to be cut above the joint. After 3 or 4 days cut the branch of the ordinary rose below the joint and plant this in the manuring earth and water regularly.

ROSE.

The grafting of Paul Neyron, Captain Krishna, Sir Walter Scott, Lepunia, Lavenir, American Beauty, Marseilles, White Rose, Red Rose, Busserah

Rose, etc., is to be made as follows: When the plants are in bloom, cut the flowers with stems about five or six *angulis* in length. Then attach prepared earth at the end of the stem. After a month sprout will appear. Then cut the branch 15 or 16 *angulis* above the cut. Then cut the remaining portion into parts each about half a cubit in length. Cuttings should be made at alternate knots. Then cut the lower ends of these parts like the tips of nibs and plant in good earth. Cover the upper parts with lumps of prepared earth. After a month sprouts will appear from all these parts. Then transplant the grafts with the roots in tact in desired places. This method yields a large number of grafts at the same time.

JASMINE, BELA AND SIMILAR FLOWERING PLANTS.

Surround a lump of prepared earth about a knot of a healthy branch of the plant and bending this lay it on the ground by attaching a weight. Water the plant continually for a month; then cut the branch above the earth covered spot. Then plant in a good place.

MARIGOLD.

For grafting select marygold with big flowers. The branches of the plant are cut and after cutting the lower extremity like the tips of nibs plant into earth and water twice daily. When the plants are strong, take them up with the roots as a whole by digging about the plant and transplant them. The deeper the grafts are planted, the bigger the flowers will be. The rearing should be best done in August-September.

MARIGOLD.

Big-sized flowers of marygold are allowed to dry and four or five of these are torn and scattered on the earth and are then covered over with good loamy earth. Now water twice daily. After about a fortnight sprouts will appear about 5 to 6 hundred in number. When a bit stronger, transplant.

CHRYSANTHEMUM.

Knotty roots about 4 *angulis* in length are planted in good soil and then water regularly. After 15 to 20 days plants will appear. The branches of the *chrysanthemum* plant when planted also give good grafts. Operations are to be made when the rains set in.

PLANT REARING.

MANGO.

First dig a hole and free the soil of all bricks and pebbles. Then put a fully ripe mango with the peel in tact. After a few days after sprouting transplant this, when strong plants will appear which will fruit in two years. The reason of digging the fruit in tact is that juice remains in the stone and the fruits are consequently fine.

JACK FRUIT.

Cells of jack fruits are planted into good soil. Care should be taken that the spot is not shaded by other plants. When the sprouts appear make a fence about these to prevent animals from destroying the plants. When strong, transplant in a soil with manuring earth.

COCONUT TREE.

First make a hole one cubit in length breadth and depth. Put into this slimy earth. Then lay a natural well-dried whole coconut and cover this again with prepared earth and then with loamy

earth and water regularly. When the plants are one cubic long, transplant in good soil with manuring earth.

LEECHEE.

Take a leechee of the Muzaffarpur variety and peel off the skin. Then place this in manuring earth and cover over with slimy earth and water regularly. When sprouts appear, transplant.

HELPING FRUCTIFICATION.

(1)

Sometimes it happens that the trees like coconut, mango, jack fruit, berry, star apple, peach, leech, etc., do not bear as much fruit as these ought to. To remedy this, dig up earth about 1 cubit deep from all sides of the trunk of the tree. Then sprinkle around the straw-meal of cows, left overnight; then scatter castor cake (powdered), cowdung cakes (powdered). Then add manuring earth and cover over with sifted loamy earth. Water twice daily so that water stands at the foot of the tree. This will help fructification.

(2)

Make a circular hole around the stem of the tree and fill this up with *puntli* fish, chopped straw, powdered castor cake and finally cover over with slimy earth and water regularly. This is a very useful device for helping fructification.

(3)

When trees or flower plants do not yield fruits or flowers, the foot of the tree or plant is dug up till the roots are all seen. Then fill up the cavity with manuring earth, straw-meal of cows, and *puntli* fish and cover over with loamy earth. Then water regularly. The

operations are to be made in June, July or August when there is abundance of rain.

PRUNING.

ROSE.

All earth round the rose plant is to be dug up so that the roots are out. Then spread a small quantity of prepared earth and then cover over with loamy earth. Now prune off the plants leaving the branches half a cubit in length only. Next water regularly. Pruning of roses should take place in the months of September-October.

BELA, JASMINE, ETC.

Take off the plants and cut the roots about 6 *angulis* in length. Fill the cavity formed with manuring earth and re-plant the shrub there. Next prune off the branches, leaving these half a cubit long. Then water regularly. The operation should be made in November-December.

Puntti Fish—a kind of carp, with shining scales, rich in phosphorus.

Anguli--Literally finger.

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TYPE-FOUNDING.

THE first and most important operation of a type-foundry is the formation of the punches, which are well-tempered pieces of sheef each of which bears on its surface a single letter, formed with the greatest possible accuracy by filing, cutting, and punching the hollows with smaller punches. The race of the punch exactly resembles that of the finished type, the letter being reversed and in high relief. The punch-cutter has

to exercise great care and judgment for making the letter of precisely the right size, form, and thickness, so that it may range well with other letters of the same fount, or set. When the punch is completed and hardened, it is struck into a piece of copper, which, when it has received the impression from the end of the punch, is called a Matrix, and forms a mould for the face of the type,

The mould for casting the type consists of two halves each of which is made of steel, and attached, for convenience of holding to a piece of wood. The two halves of the mould are so formed that they may be instantaneously fitted together, leaving a square funnel-shaped opening at the top, by which the type-metal is poured into the mould to form the body of the type with the matrix at the bottom to form the letter or face. The two halves of the mould are capable of adjustment to the varying widths of the letters. The type-metal is usually melted in a small cast-iron pot set in brick work with an enclosed fire under it and is poured into the mould by a very small ladle. The caster then jerks the mould to expel the air, and forces the fluid metal to enter the cavities of the matrix. When the metal is set, the caster helps by mechanical means to separate the matrix from the face of the type. The mould is then opened, and the type is removed by the application of a hook attached to the upper part of the mould.

When the types leave the caster, each of them has a small block of metal attached to the shank, or body of the type, being that which filled the throat

or funnel of the mould. These are removed. The next operation is that of rubbing the flat sides of the types upon a piece of grit stone. The types are then set up in long rows or lines, and these are firmly secured in long frames, which hold them together while the dresser scrapes or polishes the flat surface which forms the top and bottom of the body, and cuts a groove or channel along their low ends by means of a small iron plane. While they are in the frame, the types are also bearded, an operation which consists in planing away to a level the upper angle of the body at the feet of the letters. After dressing, the types are tied up in such lines as may be convenient, and the proportionate numbers of every type of which a fount consists are selected. All the types belonging to one fount are distinguished by one or more grooves or *micks* across the lower edge or bottom face of the body, by which simple contrivance the compositor is enabled to pick up the types and place them all upright without looking at the letter. These micks are formed by the insertion of one or more wires in the mould.

The composition of the type metal greatly varies; the chief component, however, is lead, alloyed by one or more of the following metals, iron, antimony, copper, brass, tin, and bismuth.

GLAZED BRICKS.

GLAZED bricks are chiefly made of fire-clay, the second-grade clays with fusibility corresponding to cone 26 to 30 being used. A brick to be suitable for glazing must be regular in shape, exact in size, with clear arrises, and a fine face free from small irregularities or discoloured spots. It must be sufficiently porous to absorb the water in the glaze-slip, and must be refractory enough to keep its shape whilst heated at a temperature which will suit the glaze. Such bricks are usually made by the plastic process and are repressed, before being fired, so as to obtain a good shape and face and to make them accurate in size. When made of fire-clay, bricks to be glazed are often hand moulded, as are fire-bricks and are repressed when partially dry. It must be realized that unless the bricks to which the glaze is to be applied is practically perfect the glazed bricks will be a failure.

The clay being suitable for the purpose of making a clean, well-shaped bricks, the most important part of the manufacture is the pressing. Glazed bricks must be laid with the thinnest possible joints, and for this reason, must be pressed accurately. Any good power press may be used for this purpose. Bricks which are glazed previous to burning require to be set in the kilns with the greatest care to prevent chipping, and the temperature throughout the kiln must be as uniform as possible or the bricks will be unevenly glazed.

The glazes used for bricks must be sufficiently durable to withstand ordinary climatic changes without "Crazing" or forming hair-like cracks. They must also be sufficiently hard to withstand accidental blows, and must adhere to the brick so completely that they will not

chip, or peel off. The materials used in the preparation of glazed bricks are very numerous and cannot be treated with justification in the course of a short article. The chief ingredients may be mentioned. For glazes, felspar, Cornwall stone, flint, whiting. For body, China clay, ball clay, flint, etc. For colour, metallic oxides. A few typical recipes are given for guidance.

Body.

China clay	6 lbs.
Ball clay	1 lb.
Cornwall stone	2 lbs.
Flint	1 lb.
Water	1 gallon.

Colourless Glaze.

Felspar	4 lbs.
Cornwall stone	12 lbs.
Flint	1 lb.
Whiting	3 lbs.
Water	2 gallons.

Colours.

Coloured bricks will be obtained by the addition of 1 to 5 per cent. of the following to either body or glaze.

(1) White	Oxide of tin.
(2) Red	Ferric oxide
(3) Yellow	Lead chromate.
(4) Blue	Copper oxide.
(5) Black	Cobalt and manganese chromate mixed.

CHINESE BLUE.

THIS well-known blue colour is prepared with great care and is usually sold in fine powder or little cubes. Its composition is virtually identical with that of ordinary Prussian blue, but it is more free from impurities, and shows a fine bronze bloom or lustre on newly fractured surfaces. It is extensively employed in

dyeing and calico printing. Its tint varies from greenish to violet according to modifications in the method of manufacture.

The process of preparation is mainly as follows. In about 40 gallons of cold water is dissolved 1 cwt. of green copperas selecting it carefully for freedom from insoluble oxide and then about 5 pints of sulphuric acid are added. This liquor very rapidly undergoes oxidation by which oxide of iron is thrown, and the solution is rendered unfit for making the best quality pigment. Therefore it should be prepared only immediately before it is used. In another vessel containing about 40 gallons of cold water is dissolved 1 cwt. of yellow prussiate if a green shade is desired or of red prussiate if a violet tint is wished for. Even larger quantities of water may be used for the solutions, as the more dilute they are the finer is the colour precipitated and the greater the lustre on the surface of the finished pigment.

When the two solutions of yellow or red prussiate and acidified green copperas are brought together, a bluish white precipitate is thrown down. This is allowed to completely separate itself, and then the clear supernatant liquid is drawn off.

The next step is to thoroughly oxidise the precipitate. This cannot be satisfactorily accomplished by utilising the oxygen of the atmosphere, as is done in other cases. The chemical oxidising agent giving most satisfactory results is chloride of lime. For each cwt. of green copperas about 20 lbs. of bleaching powder are mixed into a thin cream with water and add it in small quantities at a time, to the precipitate, constantly stirring so as to ensure the absorption of the whole of the chlorine by the blue.

After the addition of the bleaching powder solution to the bluish-white precipitate, it is acidified with hydrochloric acid, which develops the blue. When the whole has settled the supernatant liquid

is drawn off, and the blue powder is well washed and strained on a filter, then placed in pans and dried very gradually in the dark, at a temperature never exceeding 130 deg. F.

The slower the drying the better is the gloss of the pigment.

FRUIT CANNING.

THE selection of the fruit is an important factor in the Fruit Canning Industry. The fruit must neither be over ripe nor rotten. The fruit is now sliced, if needed, e.g., in the case of mangoes, bananas, apples, etc.

The tin can in which the fruit is to be preserved is well boiled in water for about half an hour. The fruit and the hands are also washed with fairly hot water. The fruit after washing is transferred into the boiled can, which is then filled with a solution of sugar. To make the solution some sugar is boiled in water and then cooled. The amount of sugar will depend on the sweetness of the fruit used. Very sweet fruits will require less sugar than others, while sour fruits require a drop or two of lemon juice.

The solution is poured into the can after the fruit has been placed. This tin or can is then sealed airtight by means of melted solder. Then a small hole is made in the lid with a fine nail or stout pin.

This can is now placed in a tub which contains boiling water nearly to the top level of the tin. The tin is allowed to remain in it for about 15 minutes. Then when vapour begins to come out through the hole some melted tin is taken and the hole sealed with it. The tin is finally taken out of the tub, varnished and labelled.

A fruit preserved in this way will last for years.

—BY MR RAM CHANDRA SRIWASTAVA.

THE INDIAN FILM INDUSTRY.

FILM industry in India has been the centre of criticism by the enthusiasts for some time past. It is said that the Film industry is not making any progress, and it is moreover supposed that if the Films are produced with the intention of exhibiting them abroad they can be more successful.

This supposition may be right or wrong but the facts cannot be disputed that something is wanting to bring this industry at a level with that of America and other countries.

I will now take this opportunity of giving some hints on how the Film industry can be brought to a more popular standard. I will, however add that it is not essential to send Films abroad for exhibition unless and until we ourselves are satisfied that the Films are worth sending, and that they can compete with those of the foreign make.

SELECTION OF STORES.

It is now high time for the Indian producer to change the subject of his plays. Instead of historical and mythological plays he should now produce detective, adventure and love stories. Adaptation of novels should be entirely dispensed with.

The stories should be simple and characters few, with a general Indian life as its back-ground. The public is now fed up with old plots and it now requires something new and original. In order to get good stories I will venture to suggest that the producers should hold a story competition with various prizes. In this way they will be able to secure a large number of stories from professional and amateur writers, and the best of these accord-

ing to the producer's point should be adopted for the screen and the prizes awarded according to their merit.

SELECTION OF ACTORS.

It has been noted that the Indian Film actors when about to perform some stunts or doing other athletic feats feel shy, as for instance, they look ill-at-ease on horseback.

The acting and motion of the actors are more or less stagical in a Film play. The Film play has a halo of stage about it. No doubt for emotional acting the stage actors do very well, but they are not adept in performing athletic feats.

Film acting entirely differs from stage acting. In a Film the acting ought to be simple and realistic. On stage the speech and dialogue are related to the acting of an actor. It appeals to the public because acting emphasises the words. But in a film play all that is required are facial expressions and action.

A WORD TO THE PRODUCER.

The Indian stage has created her own actors and similarly the screen should try to secure her own actors. The actors should be athletics and those who have made a name in one or the other athletic and outdoor games, should be enlisted immediately.

It is now clear as day-light that the Indian Film Companies can never hope to compete with the foreign Films at the rate they are producing their plays. I will advise all the producers to unite together and form one huge united concern and in this way they will be able to produce better and more Films than there are now producing.

—BY MR. DWARKA D. SHARMA

ORGANISATION OF ROSHA GRASS INDUSTRY IN GWALIOR STATE.

ROSHA Oil (generally known as Palmarosa oil) plays an important part in foreign perfumery and essential oil market. It is largely used by the perfumers of the European countries as a base of their essential oil industries. The value of this oil depends upon the geraniol contents: the more the geraniol contents the more the price it will fetch. Nearly most of the consuming quantity of the Rosa oil in European markets is exported from India.

Rosha grass is grown in abundance as a natural crop in most of forests of Central and Southern India in two varieties—*Motia* and *Sofia*—the names by which they are locally known. Out of the above two varieties—viz., *Motia* and *Sofia* the “*Motia*” variety is of great commercial value. The oil extracted from the other variety—*Sofia* grass is known in commerce by the name of Ginger grass oil of commerce.

Experiments have shown that the oil contents in Rosha grass grown naturally in forests differ much from the oil contents of those planted in fields as secondary crops. Attempts have, therefore, been made in several parts of Central and Southern parts of India to start the plantation of Rosha grass—*Motia* variety—and extract oil from it. The advantages of raising a plantation of this grass are numerous. First, there can be no fear of mixing the inferior “*Sofia*” variety from which, as said above, Ginger Grass oil of commerce is obtained with the superior “*Motia*” variety. Secondly, the collection is

easier; thirdly, steam distillation can be undertaken on a large scale under expert supervision.

The Rosha grass producing areas in C. P. and C. I. yield per year a handsome revenue, e.g., only Amraoti division in C. P. yields an average revenue of about Rs. 7,000 per year forming as it does an appreciable proportion of the world's total supply.

In Gwalior also there are Rosha grass growing areas which yield handsome revenue every year. But the variety of grass growing is mostly “*Sofia*” with some scattered plots of “*Motia*” variety. The collection of grass and distillation of oil therefrom, so far, is carried on by the wild tribes residing in those areas, who mix these two varieties of grasses as they have very little knowledge of their commercial value. Besides, the “*Motia*” variety is scattered here and there mixed with “*Sofia*” and it is a laborious task to collect the same separately.

As said above, the collection of grass and extraction of oil therefrom is in the hands of wild tribes residing in Rosha Grass growing areas. These people distill the oil from grass using the old type of distilling apparatus which is of the simplest construction. It consists of a large iron pot—*Deg*—having a large body with a rather narrow neck; on the top of this *Deg* is fixed a smaller pot with a hole in the centre to receive the pipe. This smaller pot is well provided with a cushion of cloth so as to prevent any leakage of vapours from *Deg*.

The pipe is formed by arranging and fastening two pieces of bamboo at an

acute angle. This is covered to the whole length with a strong bending of corded string—generally *Munj*—and over which there is a coat of earth to prevent the vapour from escaping. One end of the bamboo pipe is fixed into the central hole of the Deg and there it is cemented with flour and water. The other arm is introduced into a long-necked vessel-receiver placed in the water which is changed every now and then as it becomes hot due to the condensation of steam in the receiver. The Deg—Boiler—is heated inside an earthen furnace. The fuel used in heating is the distilled grass from which the oil has been extracted. This helps in the reduction of manufacturing cost of the oil extracted.

By extracting the oil with the above mentioned apparatus which is very rough in its construction, it is but natural that the percentage of oil obtained is poor.

With a view to organise the Rosha Oil industry in the Gwalior State a scheme along with other schemes was submitted to the Board of Economic Development of the State in 1920 and the Board was pleased to grant a certain capital for this industry. The work began in November 1920 and the land brought under Rosha Grass plantation was about 100 bighas in 1921, the same was extended to 200 bighas during the year 1922.

For the distillation of Rosha Grass obtained from the above plantation there is a big Distillery equipped with most modern distilling apparatus. There are about 15 big and small stills which are arranged for ordinary steam distillation as well as for superheated steam distillation. To produce steam for this purpose there is a big Lancashire Boiler from which steam is carried to the stills by means of pipes.

To the Works is also attached an well-equipped State Laboratory which is a great help to the works for testing the oils produced at different stages.

Besides Rosha Grass plantation, experimental farms were also laid out

of Eucalyptus, Peppermint, Lemongrass and Camphor. Out of these the former three were successfully grown but the last one, i.e., Camphor did not show any sign of growing due to the excessive heat of this place.

As late as 1923, the above concern was a State concern but the same has been handed over to a private Company, viz., The Gaekwar Oil and Chemical Co. Ltd., in May, 1923, and the Company has raised the plantation of Rosha Grass to a great extent and at the end of 1924, it was about 500 Bighas, and further endeavours are being made by the Company to acquire more land from the State on lease and extend the plantation to about 1000 Bighas in near future.

The oils, Rosha, Lemongrass, Peppermint and Eucalyptus, distilled in the above works were sent to the Imperial Institute of London for analysis who have reported the same to be of excellent quality and well prepared. These oils have also been tested at the Laboratory of Messrs. A. Boake Roberts and Co., of London with the same remarks. Along with the above oils, Dill, Clove, Cumin, Fennel, Ajowan oils and Thymol which are also distilled side by side were also sent to the Imperial Institute of London for analysis and they have also been proved of the best quality.

The company have since added to the above works as by product industries, besides the distillation of Essential Oils, the following lines:—Manufacture of Disinfectants and Varnishes, viz., Copal Varnish, Carriage Varnish, Shellac Varnish, Gold Size Varnish; Black Japan; French Polish; Washing Soap; Hair Oils.

The above is a general review of the organisation of Rosha Grass industry in the Gwalior State. It is one of the first enterprises made in raising the plantation of Rosha grass in India on such a large scale and which is working on with better hopes for further development.

—MR. B. B. HARDIKAR.

THE ADVANTAGES OF FORESTS.

(Contributed).

INDIA, once, was a country filled with wild, wide forests, being the haunt of wild animals. The ancients of India considered forest life as the best. Those who have read the 'Message of the Forest' by Rabindranath Tagore in which he clearly gives how the ancients spent their lives in forests in days gone by, may come to understand the real forest life enjoyed by the ancients. Our two great epics, the Ramayana and the Mahabharata are full of forest-life. Therefore, it is clear, that India was once the abode of great forests. But now no trace of forests is seen except some forests here and there in such a vast country as India. Many are not aware of the benefits derived from forests. These forests exert their influences over the climate, the soil, and the water-supply of a country.

Let us first consider their influences upon the climate of a country. The oxygen, which is the most essential for men and animals to keep them alive, is set free in the process of making starch. They check the destructive power of the winds. The air adjacent to them becomes cooler than elsewhere and thus cause them to vary.

Their influences upon the soil of a country are many. These are of two kinds. They serve as soil formers and improvers and as soil protectors and fixers. One sees as soon as he enters a forest, the litter of leaves, fallen and broken twigs and the floor covered with decayed matter. From this, it is clear, that trees in the forests con-

tribute to a large extent towards the formation of humus, which in its turn makes the soil very fertile. Thus the trees form one of the important factors in the enriching of the soil. When vegetables are grown in these tracts, how flourishingly will they grow?

The influences of forests over the water-supply of a country are worthy of notice. As a forest is filled with leaves, twigs and decayed wood, the water that reaches its surface does not flow, but will soak inside the leaves, twigs and wood. Moreover the roots go deep into the earth and in their doing so they make holes in the ground which are sufficient for the stagnant water on the surface to soak through. Thus for several years, this process will take place; and by this time the water gradually passes through every strata of earth and then reaches the lowest strata. What is the result of this? Springs and artesian wells are formed in these parts. Thus floods are checked as the water easily soaks through as the earth is rendered porous.

Now coming to their relations with the commercial development of a country, they are far more interesting than the previous ones. One has to study the varied and numerous commercial products to be got from forests.

The first thing that strikes one is the lumbering industry, which forms one of the chief and important industries in the world. Logs of wood are necessary as they form beams and rafters in the building of houses and ships. Many naval stores are the outcome of them. What is paper? This

is manufactured from the pulp of wood. Thus many are the important articles of commerce obtained from forests. Moreover there are medicinal drugs extracted from trees like Cinchona and others. Oils are extracted and gums are formed. These can only be achieved by the labour of man without which nothing can be possible. Therefore forests give a large amount of employments to thousands of people.

Many had a wrong view namely that they form a great obstacle in the path of travel and transportation, which is not at all the case. Railroads are constructed, boats and other travelling conveyances are built out of them. Moreover they check the course of rivers and thus cause facilities for transportation.

Therefore it is necessary, that much efforts should be taken in the direction of preserving forests. Many are the natural resources springing from the earth which owe their origin to forests. Diamond which is the costliest and the hardest of substances, is after all the result of vegetable matter pressed under the earth for a long number of years.

England is the largest of the manufacturing countries in the whole world and next to it come France, Germany, United States and so forth. What is this due to? Nothing but coal without which no manufacture can be carried on. How is this coal which forms such an important factor in the development of the industries of a country formed? This is caused when vegetable matter decays under water or under deposits of sand and mud in the absence of air. Layers of coal are formed underneath the earth. Trees, that are in a flourishing condition bury themselves under the earth. The land sinks above them due to several geological effects. Thus layers of coal are formed. Above this there is ground and trees grow over this and these in course of time sink under the earth; and another layer of coal is formed. Therefore there will be abundance of coal formed beneath the earth.

Ideas for Small Capitalists.

Mr. Bhagat Singh, Rawalpindi sends us the following:—

(1). MANUFACTURE OF VINEGAR.

Any one with a small capital in his pocket, can earn a decent income by manufacturing excellent cheap vinegar. A suitable recipe for the same follows. Mix 25 gals. of warm rain water, with 4 gals. molasses and 1 gal. yeast, and let it ferment; you will soon have the best of vinegar.

Put in bottles, cork and label beautifully and put on the market at a reasonable price. This will command very brisk sale leaving substantial margin of profit for the manufacturer.

(2). ELECTRIC POWDER.

To 4 pounds best quality whiting add $\frac{1}{2}$ pound cream tartar and 3 ounce calcined magnesia. Mix thoroughly. Put in two ounce wooden boxes beautifully labelled with instructions for use. It will sell like hot cakes as every house keeper will buy it. It is very useful for gold and silver-plated ware, German silver, brass, copper, tin, steel or any other metal where a brilliant lustre is required.

It will take less than two annas to manufacture, while it can be easily retailed at six annas a box. If properly prepared and neatly presented the above article will secure the fortune of any one.

Directions for use.

Use the powder dry, with a piece of good flannel, moistened previously with water or alcohol.

(3). TOILET POWDER.

One can earn a large sum by manufacturing good toilet powder; a recipe for the same is as under:

Boric Acid	1 oz.
Precipitated Chalk	2 oz.
Powdered Talcum	7 oz.

The above ingredients make a very good and cheap toilet powder and the manufacturer will earn lot of money.

(4). MENTHOL TOOTH POWDER

The following article will find a brisk sale in the market, as every one is fond of beautiful and sound teeth. It requires a small capital to start this business.

Formula for the same is—

Menthol Crystals	12 gr.
Precipitated chalk	2 lb
Kaolin (powdered)	1 lb
Myrrh (powdered)	4 oz.
Oil of cloves	40 drops
Oil of lemon	2 dr

Mix the menthol with the oils, then gradually mix in the chalk and then the others. After all has been well-mixed, pass through a fine sieve. It is the best tooth powder ever made. It cleans the teeth for sure, stops bleeding gums and sweetens the breath.

Put in small tin boxes beautifully labeled. Retail it 2 annas a tin.

This should be extensively advertised in some good and widely circulated papers to ensure success.

(5) HOW TO MAKE CLOTH WATER-PROOF

An energetic young man can easily earn good living, with a very small capital, if he acts up to the following plan.

He should open a good shop for water-proofing garments in 24 hours, in a centrally-situated site of his town or city.

Dissolve 8 pounds of oleic acid in 6 quarts of alcohol; add gradually 20 pounds sulphate of alumina, leave 24 hours to settle, after which carefully pour off the liquid and save the remaining deposit; filter this through flannel and press into a cake. Dissolve one pound of this in 15 gallons of water, strain, saturate the fabric thoroughly, remove and let dry. The fabric is water-proof without having its ventilating qualities destroyed.

(6) SEWING MACHINE OIL.

As now-a-days a very large number of sewing machines are in use throughout the country, it is a very profitable idea to manufacture sewing machine oil, which is quite necessary to keep the machines in thorough running order.

Two recipes follows.

(a) Petroleum	3 oz.
Pale nut oil	9 oz.
Oil of almonds	40 mm.

Mix and filter for rough work.

(b) Pale oil of almonds	9 oz.
Rectified benzoline	1 oz.
Oil of lavender	1 oz.

Mix and filter for fine work.

The above should be put in small phials corked and beautifully labeled.

(7) MANUFACTURE OF DIGESTIVE POWDER.

Pancreatin	3 parts
Sodium Bicarbonate	15 parts
Milk of Sugar	2 parts

Mix thoroughly and put in small phials corked and labeled neatly. The above ingredients yield a very good digestive powder at a small cost which is sure to bring good returns to the manufacturers.

Small Trades & Recipes.

Making Billiard Table.

A first class billiard table consists of a bed of slate 12 ft. by 6 ft., $1\frac{1}{2}$ in. to 2 in. thick, resting on very stout frame work supported on eight massive legs, and supplied with cushions, cloth, and pockets. The proper height is 3 ft. from floor to top of cushions. The ordinary billiard table is 8 ft. by 4 ft., without pockets. The best wood for the frame work is mahogany, but *sishu* may be employed. It is of paramount importance that all wood should be well seasoned. The legs are 7 in. in diameter, and carved or turned—not tapering, however, or in any way materially decreased in thickness. The outside rails are 10 in. by 3 in., ornamented taste, mortised and bolted into the tops of legs. Nine inside rails, 6 in. by $1\frac{1}{4}$ in., laid longitudinally, mortised into side rails, and braced and bolted together. Slabs of slate ground to a very fine surface are used for the top: this is covered with cloth made for the purpose. The cloth is secured to countersunk wood blocks in the bottom of the bed. Six cushion rails are bolted to the top edge of the slate. The cushions are formed of eight plies of strip rubber, varying from $1\frac{1}{16}$ in. to $\frac{1}{8}$ in. in thickness, so convolved as to make the projection inside the table about $1\frac{1}{2}$ in. altogether. Vulcanised rubber is used, because it is not affected by changes of atmosphere. The cushions are screwed

to the cushion rails; the pockets are attached to the pocket rails by stout, semi-circular brass rims.

Enamelling Photographs.

Procure several pieces of glass free from imperfections, a little larger than the prints to be operated on. Clean them, and soak for some time in a strong solution of washing soda, swill well with clean water, and stand to drain. When dry, clean them with a perfectly clean cloth or tissue paper. Dust slightly with French chalk, and rub in with a piece of soft rag. Then remove the chalk with a piece of damp rag all round the edges about $\frac{1}{8}$ in. in, or the prints may strip prematurely whilst drying. Coat the plates with enamel collodion, and allow to dry, in which state they will keep for a long time. Make a solution of 1 oz. of soft gelatine to 8 oz. of hot water, and filter into a warm dish. In this immerse the prints for a few minutes take them out one by one, drain, and squeeze on to the prepared plates so that they are in perfect contact. Immerse for fifteen minutes or so some pieces of cardboard $\frac{1}{8}$ in. larger all round than the prints in the gelatin solution, drain, and squeeze these to the backs of the prints. Put the whole aside for twenty four hours to dry, when they will easily strip, bringing the collodion away with them.

INDIA'S INDUSTRIAL PROGRESS.

Damp-proofing Matches.

It is understood from the Report of the Department of Industries, Bengal, for the year 1924 that the experiments on the damp-proofing of match composition were continued by the Industrial Chemist during the year. It has been found that identical and comparable results could not be obtained by working with hand laboratory apparatus. Accordingly power-driven laboratory apparatus were imported from England. An Abbe Ball Mill, An Atlas Cone Mill and other appliances have been purchased and it is hoped that systematic results will be forthcoming in the near future. It appears from the researches that the cottage workers in Bengal using hand apparatus for preparing the composition are not likely to succeed in producing the right type of first class safety matches similar to those manufactured by Sweden. To obviate the difficulty the cottage workers unnecessarily increase the fierceness of the composition. Government have made a special grant of Rs. 3,000 for the purchase of further chemicals and apparatus for carrying on investigations on matches.

Systematic examination of the damp-proofing qualities of the different samples of Continental glue were also carried out in this connection. It has been found that skin glues as a class are most resistant to damp.

Hydro-Electric Schemes in South India.

In addition to mineral wealth, Mysore has immense scope for the further development of hydro-electric schemes. The Sivasamudram project, combined with the Krishnarajasagara Project, benefits the industries only in Mysore, Bangalore and the Kolar Gold Fields. The Mekadatu waters, in respect of which Madras has given over her rights to Mysore, on certain conditions, will have to be utilized in the near future, to meet the growing demand for power from the Kolar Gold Fields and other industrial enterprises. The Malnad has even more possibilities for industrial development. There is considerable scope for starting a match factory, paper industry, sugar factory, mineral industries and so many other important industries which will require cheaper power. The question of harnessing the Gersoppa Falls for the generation of electric power has long been under the consideration of Government. Recently, a special survey of this important project with reference to the power prospects, etc., was ordered and the report of the officer in charge has just been received. This is a scheme entailing a very large outlay, which, if carried out, will open up the Malnad to high industrial enterprise, and will enable the Bhadravati Works to develop a number of subsidiary industries. The scheme will be thoroughly investigated from all standpoints during the current year.

SCIENTIFIC AND TECHNICAL TOPICS.

Wing Motion of Insects.

An insect is so light that it has little momentum, so that the wings must continually pull the body forward as well as lift it. Since there is a little momentum the lifting and the pulling must be as nearly continuous as possible. Therefore the wing motion of insects is comparatively more rapid than that of birds. The common cabbage butterfly moves its wings at the rate of 540 strokes per minute; the sphingio moths at the rate of 6,600 beats per minute; the honey bee at the rate of 11,400 beats per minute; while the wings of the common house fly vibrate at the rate of 19,800 beats per minute.

The difference in the area of the wings of a mosquito and of a stork, relative to the widely different weights of their respective bodies, may be appreciated when it is realised that if a stock had wings proportionately as large as those of mosquito, the wings would have an area of almost twenty-eight and a half square yds., and an expanse of more than twenty-five feet.

It has been determined that the great blue heron flies at the rate of twenty-eight miles per hour, the red-tailed hawk at twenty-two, the flicker at twenty-five, and the raven at twenty-four. The insects fly at greater speed than this and thus they have little to

fear from birds. Birds that travel at a rate approaching that of the large dragon flies often become victims of their own speed. Being heavy, they cannot turn aside to avoid danger. Put a net suddenly in front of them and into it they go.

Trees That are Almanacs.

That trees give weather reports for ages long past when there was no weather bureau to record them are being investigated by scientists, whose studies are based on the minute examination of the annual growth rings of trees. It is a commonly known fact that these rings are formed at the rate of one a year. The light, porous section grows in the spring when there is plenty of water, and the denser part grows when the summer drought comes. The studies made on the effect of years of drought as compared with years of plenty show that every event in the life of a tree left its record in the rings.

The discovery of the correlation between known historical climatic conditions and comparatively recent tree rings, has led to researches being made into earlier centuries using trees of age-old forests as time-sticks.

One of the interesting pieces of information shared by the trees is a confirmation of the theory of an eleven-

year sunspot cycle held by astronomers and weather students. Every eleven years there is a band of relatively narrow rings, indicating a time of heat and drought, with wider rings in between that tell of easier times.

New Theory of Light.

The phenomena of light have given rise to various theories of light; the first in the field was the corpuscular theory as elaborated by Newton, next came the wave theory of Huyghens and Young, then the electro-magnetic theory as developed by Maxwell and then theory of quanta as expounded by Planck.

Recently a hypothesis has been advanced by Sir J. J. Thomson, the well-known physicist. He reverts to Newton and converts the two ideas in a single brilliant hypothesis. Light or energy is radiated in discrete form, not as corpuscles, but as "rings of energy" detached by the violence of the impact when atomic disturbance causes the line of force connecting an electron with its atomic nucleus suddenly to jerk round into a closed loop. The circumference of the ring of energy is the wave length of the radiation emitted and the pulsations induced in the ring of energy on its formation are supposed to give rise to Maxwellian waves that accompany it as it proceeds through space. The hypothesis explains all the known phenomena of light and according to this light is both corpuscular and undulatory and Newton and Young are reconciled.

If this highly-suggestive hypothesis stands the test of time and prove to be the basis of an acceptable theory, it will

surely rank as the most important of the very great contributions, which its author has made to our knowledge of the physical universe.

Storing Sounds On Steel.

A man sitting in an office in Berlin, Cape Town, or Peking may soon be able to dictate a letter that will be heard and taken down instantly by a shorthand writer in an office in London.

This is one of the startling results of an invention perfected in a Berlin laboratory. The invention, which has taken eighteen years to perfect, consists of recording and storing sounds on steel. The sounds are recorded on a steel wire by electromagnetic means, so that the wire bears no surface marking of any kind and can at any time be "emptied" of its sound contents in readiness to receive others.

The wire can be connected with any telegraphic cable, which conveys the sounds farther. It is predicted that within a short time every newspaper correspondent in the world will be able to dictate his articles direct to his office.

To empty the wire is a very simple matter: one simply reverses the process and re-transforms the magnetic waves into ordinary sound-waves.

Instead of being "emptied" for further use (says a writer in "Science" the charged wire may be disconnected and stored up, when it will, on being reconnected, repeat its sound contents as often as desired. The life of such a sound wire, unlike that of a phonograph plate, is limitless.

Wool From Wood.

"Collulose batting" (or wadding) is an attractive form of wood wool to which German surgeons and hospitals turned during the war shortage of cotton. The unbleached batting is simply wood-pulp cellulose freed from its resin, and this seems to be quite suitable for some purposes. The finer bleached material is a product of further treatment. The resin-free sulphide cellulose is carefully whitened with chlorine, acid and chlorine are removed by washing, and the mass is passed through a series of pulping machines to a batting machine, which draws it out into a very thin fleccc. On a drying cylinder, the steam from the moisture tends to separate the fibres and burst the fibre cells. Scraped from the cylinder the material is a wavy or creped single fleece too delicate and porous for use, and six to twentyfour layers are mechanically pressed together, then made into rolls or packages. The product is a pure, soft, absorptive cellulose agreeing very closely with the "wool" prepared from short-fibred cotton. The cellulose batting, sometimes reinforced by placing between for surgical bandages, but is adapted for a variety of other uses, such as inner soles for shoes, wrapping for fragile china, insulation against heat or cold or material for filters. A blotting paper prepared from it is claimed to be very superior to others in absorbent qualities.

Man 3,000 Years Hence.

The remarkable conception of the superman 3,000 years hence is a Cyclops with a massive skull as bald as a billiard ball, toothless, possibly earless, and with his joints resembling a complicated machine.

Nature in evolution follows the laws of progress and tends to reduce to a minimum our physical parts by rejecting all superfluous organs of the body, replacing them with automatic aids. It is maintained that we are gradually progressing from the hairy caveman to the hairless age when all our species will be entirely devoid of hair.

A man's skull 3,000 years hence will have attained an enormous size to contain the great brain. The ever-increasing use of grasses, denotes the decay of vision and the eventual disappearance of the eyes, to be replaced by artificial organs or by another of sight situated possibly in the centre of the forehead.

A similar disappearance of the ears may also occur, while teeth will vanish, being of no further use, since our nutriment will all be in peptonised form and biting and chewing will be lost accomplishments. The reduction of the stomach capacity and digestive organs will follow naturally, while the joints of the arms and fingers will become more intricate to enable us to use the complicated instruments and machines which our brains will invent.

On the other hand, the entire nerve system will be developed to the first degree, and we shall all be mere bundles of nerves.

The whole of the sensitive organ will be like magnetic needles reacting to the slightest sound or movement. Among the enormous artificial developments in addition to the harnessing of the ocean to provide energy in the form of heat, light and power will be the development and diffusion of heat from the bowls of the earth.

FORMULAS, PROCESSES & ANSWER.

Bird Stuffing.

1047. K. P. S. R., Godavary. Wants us to publish an easy method of stuffing birds.

Fill the mouth with cotton-wool to absorb moisture and tie beak. Lay the bird, back down, on a cushion covered with clean cloth, and make a cut, just through skin, from top of breast-bone to near vent. Turn back skin and whilst doing this always dust in" flowers of sulphur to absorb moisture and prevent soiling of feathers. Having skinned to legs, divide at knee-joints, force up leg-bones to ankles, clean them, dress with preservative composition, wind cotton round them to make up natural size, and replace. Skin to beginning of rump-bone; cut through it. Hang up bird on a hook by remaining rumpbone. Skin back, treating wings as legs; skin down to skull. Separate it from the vertebrae, clean and dress it, scooping out brains and filling cavity. Dress skin with composition. Take a wire rather longer than bird, point one end and turn back the other like head of a skewer. Run a cork up to the head, and round the cork wind an artificial carcass of tow, etc. This carcass is to be put into the skin, the head of the body-wire resting against the rump-bone, and the point coming out through top of skull. The thinner wires of legs, tail, etc. are to be thrust into the artificial carcass. The skin has

now to be padded out to its proper shape, a blunt wire or cane being used in padding and the skin is sewn up. The glass eyes are put in with a little putty, and the back corners of lids drawn together with fine needle and thread to keep them in place. Set up in position by means of the legwires left projecting through feet. If large feathers of wing or tail are to be shown, spread out, pin them before drying on cardboard with slips of cork. Thoroughly dry at fire just so hot as not to singe feathers. The following preservative composition will be necessary:—Arsenic, 2 dr., Corrosive sublimate, 2 dr.; Camphor, 6 dr.; Nut-galls, 1 oz.; powdered Capsicum, $\frac{1}{2}$ oz., and Sal-ammoniac, $\frac{1}{2}$ oz., and Sal-ammoniac, $\frac{1}{2}$ oz.

French Polish.

1334. S. H. A., Tirthaballe.—Enquires how French polish is obtained.

A beautiful French polish can be prepared in the following manner. Take 700 parts of methylated spirit, 15 parts of copal, 7 parts of gum-Arabic and 30 parts of shellac. The resins are first pulverised and sifted through a fine piece of muslin. The powder is placed in a flask, the spirit is poured over it and the flask is then corked. By putting the flask in a moderately warm place, the solution will be accomplished in 2 or 3 days. It is then strained through a piece of

muslin and kept in hermetically closed bottles. This polish gives a beautiful appearance to the carvings, and a gloss and richness of colour which cannot be obtained by any other means. It is especially adapted for polishing fine furniture. To give to articles polished with this lacquer the finest finish possible, the following preparation is used. Put 8 parts of shellac and a like quantity of benzoin and 350 parts of rectified spirit into a flask, keep this in a warm place until all the gum is dissolved, and shake it vigorously. To the cold solution add a small portion of the best poppy seed oil, which should be as clear as water; mix all intimately together and keep it for use.

Lacquers.

2013. A. S. Udamalpet.—Wishes to know how lacquers are made.

We give below recipes of lacquers of different colours. As these are often wanted in different shades of colour, it is well to keep on hand a concentrated solution of each colouring ingredient so that it can be added at any time to produce the desired tint.

Deep Golden Lacquer.—Seed lac 3 oz, turmeric 1 oz, dragon's blood $\frac{1}{4}$ oz, alcohol 1 pint. Digest for a week, shaking frequently; then decant and filter.

Golden Lacquer.—Turmeric 1 lb, gamboge $1\frac{1}{2}$ oz, gum sandarac $3\frac{1}{2}$ lbs, shellac $\frac{3}{4}$ lb, (all in powder), rectified spirit 2 gallons. Dissolve strain and add 1 pint of turpentine varnish.

Red Lacquer.—Spanish annatto 3 lbs, dragon's blood 1 lb, gum sandarac $3\frac{1}{4}$ lbs, rectified spirits 2 gallons. Dissolve, strain

and add 1 quart of turpentine varnish.

Pale Brazen Lacquer.—Gamboge (cut small) 1 oz, aloes 3 ozs, pale shellac 1 lb. Dissolve and mix.

Sewing Machine Oil.

923. D. S. G & Co., Ahmedabad. Desires to know how sewing machine oil can be prepared.

What oil should be used as lubricant in sewing machine is first to be considered. Formerly sperm oil was used universally as the best adapted to the conditions to which a sewing machine is subjected. In the case of sewing machines used by tailors which regularly operate almost daily, sperm oil is without its rival. But in the case of family machines which are often left idle for weeks together, it is considered to be not the right type of lubricant. In such cases petroleum oils are better adapted for the lubrication of sewing machines than any of the animal oils. The use of 1 part of petrolatum and 7 parts of paraffin oil is recommended by authorities for the purpose.

A mixture of olive oil, 3 parts; almond oil, 2 parts; rape oil, 1 part is made and is treated with alcohol. This mixed lubricant is fairly fluid.

Two other recipes will be found in the January 1924 issue of Industry.

Removing Ink Stains from Linen.

484. V. S. R. K., Nasik—Enquires for directions for removing ink stains from linen.

The following directions will be helpful:—

With a clean rag or sponge rub the soiled spot with lemon juice in which has been dissolved a small quantity of salt.

Fish Bait.

698. M. C. S., Kathiawar—Requests us to publish a recipe for fish bait.

The following is a good recipe for fish bait.

Oil of Rhodium	3 parts.
Oil of Cumin	2 parts.
Tincture of Musk	1 part.

Mix. Put a drop or two on the bait, or rub trigger of trap with the solution.

The Use of a Duplicator.

826. S. J. R., Cawnpore. Asks us how to use a duplicator.

The duplicator is known as the hectograph. It is in fact a gelatin pad used for duplicating letters, etc., by transfer. The pad should have a tough elastic consistency, similar to that of a printer's roller. The letter or sketch to be duplicated is written or traced on a sheet of heavy paper with an aniline ink (which has great tinctorial qualities.) When dry this is laid, written side down, on the pad and subjected to moderate and uniform pressure for a few minutes. It may then be removed, when a copy of the original will be found on the pad which has absorbed a large quantity of the ink. The blank sheets are laid one by one on the pad, subjected to moderate pressure over the whole surface with a hand roller of wood or rubber, and lifted off by taking hold of the corners and stripping them gently with an even movement. If this is done too quickly the composition may be torn. Each

succeeding copy thus made will be a little fainter than its predecessor. Thus about 50 legible copies will be obtained. When the operation is finished the surface of the pad should be gone over gently with a wet sponge and the remaining ink soaked out. The superfluous moisture is then carefully wiped off, when the pad will be ready for another operation.

Painting on Glass.

852. G. B. D. S., Vizagapatam. Desires to be informed how glasses can be painted.

Make your glass perfectly clean, and place it over the picture you wish to copy; then with a sketching preparation, trace on the glass all the lines connected with the figures of the picture which you are copying, being careful to sketch views very distinct; when the sketching is done and dry, proceed to lay on the background inside of the sketched lines until all the sketching is closed; and when the back ground is dry proceed to put on the colours, commencing with the green, if any in the figures, ending with yellow. When the colours are all laid, put the background upon the balance of the glass; and when all is dry have tinfoil crumpled very much in your hand, and then partly straightened out, and lay it over the figure and keep it in its place by pasting paper over it in such a manner that it cannot slip away, letting the paper cover the whole back of the glass, or a wood-back can be placed behind the glass, and all is complete and will look well or ill, according to the practice and taste of the painter.

Pure Culture of Yeast.

1004. A. T. B., Allahabad. Wishes to be enlightened on the pure culture of yeast.

For the propagation of pure culture of yeast, the flasks which contain the nutrient gelatine are cautiously heated until their contents are liquid, when they are placed in the water bath. For pure cultivation young cells are taken in vigorous vegetation. A small number of them are diluted in the flask with sterilised water until it becomes slightly dull; the flask is shaken in order that the cells may be uniformly distributed; a few drops are taken out with a glass rod and examined under the microscope. A low power is used so as to just distinguish the cells from other small accompanying bodies. The purpose of this first microscopic examination is to estimate the quantity of cells in the mixture. After it has been well shaken up, and ignited, platinum wire is dipped into the liquid and quickly inserted into one of the flasks containing nutrient gelatine. The temperature of the gelatine must not exceed 35 degrees; it is sufficient, if kept liquid, and the microscopic examination shows that the platinum wire is to be plunged in only to the depth of 2 millimetres; in the opposite case it is plunged in more deeply.

Preventing Rust.

1471. A. W. W., Bombay—Enquires how to prevent rust.

Adopt the following process for preventing rust.

Melt slowly together 6 or 8 oz. lard to 1 oz. rosin, stirring till cool; when

it is semifluid, it is ready for use. If too thick, it may be further let down by coal-oil or benzine. Rubbed on bright surfaces ever so thinly it preserves the polish effectively, and, may be readily rubbed off.

Deodorising Castor Oil.

1441. S. K. A., Ambala City.—Wants to know how castor oil is deodorised.

Deodorising of castor oil may be effected by subjecting it to the simultaneous action of steam at 108 deg. to 110 deg. C., and of a saturated solution of alum or aluminium sulphate. The oil is kept at a temperature of about 80 deg. C. until the sediment deposits, after which the clear upper layer, which is now odour-less, is withdrawn. Oil thus treated is said not to resume its odour on warming, even in the case of fish oils.

Glass Making.

1892. A. A. A., Madras. Wants to learn how glasses are made.

The principle of the production of glass is very simple, although great skill and experience are necessary to insure its excellence. Silica (commonly under the form of sand) is heated with carbonate of potash or of soda and slaked lime or oxide of lead, until the mixture fuses and combination takes place. After a time the melted mass becomes perfectly limpid and free from air-bubbles, when it is allowed to cool until it assumes the peculiar tenacious condition proper for working. The operation of fusion is conducted in a furnace, circular in form and of sufficient size to admit 8 or 12

large melting pots. Doors in the wall of the furnace give access to these pots, and the low-domed roof causes the heat to be reflected down upon them. These pots are made of well-prepared and well annealed clay; some of them are 3 feet wide, 4 ft. high, weigh 10 cwt. and will contain 16 to 20 cwt. of glass. They are closed on all sides, except a projecting mouth near the top of one side. The frit (the name given to the powder into which the constituents of glass are reduced before melting) is thrown into the pots through the furnace doors; the doors are closed, the heat is urged to the highest point; and then the glass is ready for use.

Engraving on Glass.

1605. S. D. S. Benares is desirous of knowing the processes of engraving on glass.

Lines and figures on tubes, jars, etc., may be deeply etched by smearing the surface of the glass with beeswax, drawing the lines with a steel point, and exposing the glass to the fumes of hydrofluoric acid. The acid is obtained by putting powdered fluorspar into a tray made of sheet lead and pouring sulphuric acid on it, after which the tray is slightly warmed. The proportion will of course vary with the purity of the materials used. Where a lead tray is not at hand, the powdered spar may be poured on the glass and the acid poured on it and left for some time. As a general rule the marks are opaque, but sometimes they are transparent. In this case, cut them deeply and fill up with black varnish, if they are required to be very plain, as in

the case of graduated vessels. Liquid hydrofluoric acid is not suitable as it leaves the surface on which it acts transparent. It may be here mentioned that the agent that corrodes the glass is a gas which does not remain in the mixture of spar and acid but passes off in the vapour. To do fancy work, with ornamental figures, letters and monograms, sand blasting is often practised. This consists in corroding glass by violently projecting sand upon its surface by means of a current of air or steam. For this purpose a cylindrical vessel with a conical jet at the bottom is taken. The vessel is filled with well-dried sand and there is a spout entering through the upper end of the vessel up to the jet. Strong air or vapour is blown through the spout and this causes the sand to fall upon the glass plate with vehemence. By varying the quantity of the sand, the volume and the velocity of the current, as well as the diameter of the jet, more or less rapid effects are produced. In engraving on glass, very little pressure is needed, the current from the bellows being quite sufficient. In this way the divisions on the graduated tubes, the labels on bottles, etc., can easily be engraved in laboratories with but little trouble. The portions of the glass which are to remain clear are covered with paper, or with an elastic varnish, these substances being sufficiently exempt from the corroding action of the sand.

SERVICEABLE GOODS.

High Class Ready Made Swadeshi' Clothes.

Madras Tassar Coat Rs. 4/- and Rs. 3/-;
Suit Rs. 7/8 and Rs. 5/4; Twill Shirts Rs. 1/8;
Jaffer Shirts Rs. 1/6; Warm Frocks As. -12/-.
½ with order. We defy competition in Prices
and Artistic Cutting.

MAHINDRAKAR BROS.,

Bombay No. 4 or 12 & Poona City.

Cleaning Jewellery.

1943. N. G. Bombay. Asks how jewellery can be cleaned.

Gold chains and other articles of gold and silver having no stones set in them, may, for cleaning, be well washed in strong soda water and soap, being afterwards rinsed in plenty of cold water and dried in sawdust in a warm place. Rings or other articles bearing stones (except pearls), may also be served in the same way, and the settings may be well cleaned out by fine-cut wood pegs and pieces of thread passed through the small openings. When polishing use a soft watch-brush charged with a little dry rouge for the engraved or chased parts and rouge and water on the bare fingers for the plain parts. A wash after this is necessary to remove the rouge from the crevices. Some cleaners use prepared chalk for cleaning instead of soda water. Stone settings can be washed with soap and water then rinsed thoroughly in alcohol and dried in boxwood saw dust. To clean diamonds wash thoroughly with soap and water to which a few drops of ammonia have been made; rinse in pure water, immerse for a moment in alcohol and dry in boxwood sawdust. It must be borne in mind that sawdust for cleaning jewellery should come from whitewood. The best sawdust to use is that from whitewood. Have the sawdust slightly warm in use.

Starch Gloss Cream.

1783. H. C. N., Rangpur. Wants a recipe of making starch gloss for laundry use.

(1)

Water	100 fl. oz.
Glycerine	15 fl. oz.
Stearic Acid	6 ozs.
Powd. Borax	6 ozs.
Pale Gum Arabic	6 ozs.

Boil borax and stearic acid in half the water, add gum (powdered) to rest, then the glycerine. Strain and mix whilst warm. Good for cold water starching. Use a wineglassful to every four ounces of dry starch.

(2)

Water	62 lbs. (weight)
Borax	3¼ lbs.
Stearic Acid	3¼ lbs.
Talc	3¼ lbs.
Powd. Gum	
Tragacanth	5 ozs.

Put tragacanth in 1½ gallons of the water to swell for a day or two, then dilute with the remainder of the water (boiling), add borax, then stearic acid (powdered), the talc next and stir well. To use, one part of above is added to four parts of boiled starch, or the composition may be sponged on the starched wash just before ironing.

Soap and Perfumes.

Terpineol, Geranium, Benzylacetate, Neroly Artificial, Musc Paste, Musc Artificial and other aromatic compounds of highest strength. Quality guaranteed. Prices moderate. Send for **sample Free.**

Anglo Indian Drug & Chemical Co.,
155, Juma Musjid Circle Line.
BOMBAY.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries of replies from our experts will be published free of charge. Questions are not generally replied by post.]

831. S. L. Basti.—Process of preparing benzoated oil will appear in an early issue.

840. M. A. B. Moulmein.—Process of curing tobacco will appear very soon.

861. K. R. Sathamjadi.—An article on boot polish manufacture appeared in June 1923 issue. Recipe of bar soap like sunlight soap will be found in August 1921 issue. Artificial camphor is prepared by mixing oil of turpentine with muriatic acid. Other enquiry is engaging our attention.

878. P. N. Delhi.—Process of cleaning stains from plate glass will appear in an early issue.

920. G. R. Shalibanda.—Consult a chemist. Your second query is impracticable. For spleen complaint consult a physician.

945. M. C. D. Calcutta.—Process of preparing duplicator appeared in August 1925 issue.

955. N. S. R. Shillong.—Process of preparing tobacco leaves will appear in an early issue.

962. K. M. Karachi.—You may try with glycerine for moistening sugar.

977. R. G. D. B. Hyderabad.—You may use aniline dyes in your hair oil. For filtering oil you may use filtering paper or flannel.

979. K. C. V. R. C. Cocanada.—Refer your query to the Fisheries Dept., of your province.

1005. B. W. Kurnool.—Process of preparing lead shot appeared in July 1925 issue.

1006. P. B. B. Rajahmundry.—Fire Works may be supplied by Furukawa Feinosuke, 2089 Sonesaki Komie Shichanae and Kawamura Enkoshu, Sonezaki Kaminichane, Ktaku, both of Osaka, Japan. Indian drugs and roots may be supplied by Bansidhar Dutt & Sons, 126, Khengraputty, Barabazar, Calcutta.

1008. J. D. R. Dharmavaram.—Process of removing ink stains appeared in May 1925 issue.

1013. B. G. C. Arni.—Recipe of inks for brass seals appeared in July 1925 issue.

1033. M. A. R. Kymore.—An article on the preparation of natural colours appeared in July 1925 issue.

1043. S. M. C. Letekujan.—Recipe of lice killer appeared in July 1925 issue.

1058. B. A. Belur.—Process of making mirror appeared in July 1925 issue.

1065. O. S. M. Moulmein.—For medical books enquire of Butterworth & Co., 8, Hastings Street, Calcutta.

1074. M. B. M. Badulla.—Process of softening ivory appeared in May 1924 issue.

1096. S. B. J. Dhanpuri.—Your idea is impracticable.

1098. M. T. M. Shwedaung.—Formula of face cream appeared in July 1924 issue. Recipe of face powder will be found in September 1924 issue.

1107. K. R. Tirupur.—Process of dyeing cotton piece-goods appeared in August and September 1925 issues of INDUSTRY.

1111. B. P. Patna.—Process of mercerising yarn appeared in July 1925 issue.

1134. H. S. K. Multan City.—Vide No. 1058 above.

1136. N. D. B. D. G. Khan.—Process of preparing a duplicator appeared in August 1925 issue.

1138. P. K. Palladam.—Your query is receiving our attention.

1557. M. R. R. Salem.—Process of dyeing mercerised cotton is the same as ordinary cotton, the process of which appeared in last two issues. Recipe of snow cream appeared in July 1924 issue which you may get from this office.

1558. G. B. A. Rehabari.—Carpenter's tools may be supplied by N. G. Mitra, Chandney Chawk, Calcutta. Other tools you require may also be supplied by the above firm. Precious stones may be bought of Benode Behari Dutt, 1, Bentinck Street, Calcutta.

1560. G. H. M. J, Bassein—Embroideries may be supplied by Montreux Knitting House Ltd., Montreux and Menziken Knitting Works Weber and Heiz, Menziken; both of Switzerland. The process of refining oil consists in treating the oil with animal charcoal in the proportion of four to one by weight. The animal charcoal should be finely ground before it is mixed to the crude oil. The whole is put in glass or China jars and covered over with a lid and is then exposed to the rays of the sun for 15 days successively. Impurities are absorbed by the charcoal and on filtering refined oil is obtained. You may consult The Chamber of Commerce Journal 5, Houche Ichome, Yokohama, Japan; The World Salesman, P O Box 223, Yokohama, Japan; Swiss Exporter, Chamber of Commerce, Berne, Switzerland; The Czechoslovak Trade Journal, P O Box 476, Prague, Czechoslovakia and Ubersee Post, 10, Solomonstrasse, Leipzig, Germany. Motion picture cameras may be supplied by Precision Machine Co, Inc, New York. For Chemicals enquire of Dr Jordt and Schade, Aktiengesellschaft, Hamburg, Vorsetzen 41, Germany.

1561. M. T. S, Rangoon—For industrial books enquire of Thacker Spink & Co, 3, Esplanade East and Chakraverty Chatterjee & Co Ltd, 15, College Square; both of Calcutta.

1562. L. N. L, Gorakhpore—For filter construction consult a mechanical engineer of your locality. Boil branches of the plant in sufficient quantity of water; when it becomes pasty dry in the sun and powder. You may mix this powder with ordinary tooth powder.

1563. N. C. M, Rangoon.—Refer your queries to The Swiss Industrial Bureau, Lausanne, Switzerland.

1564. M. H. M, Bassein.—Recipe of baking powder will be found in August 1924 issue. Process of preparing different kinds of lavender water appeared in September 1924 issue. Recipes of dyeing cotton and silk appeared in the last issue.

1567. M. B, Delhi.—You may write to the Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta for hair belt making machines which they can indent

on your behalf. Waste materials may be supplied by P. S. Michael, 76, Prinsep Street, Calcutta; Hepworth Bros. Ltd., Moorcraft Mills, Osselt, Yookshire, England.

1569. V. R. M. S, Bellary.—Refer your query regarding printed tin boxes to the Editor, Export and Import Review, 38-39, Krausenstrasse, Berlin, S W Germany.

1570. M. A. M, Haveli—Your previous letter is not traceable.

1571. B. N. B, Kusthia.—For small grain grinding machine enquire of Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar St., Calcutta.

1574. D. R. G, Jagadhri—You may exchange stamps with some one residing in the state whose stamp you require. Chemicals may be supplied by Arakanda Chotaro & Co, 5, Nichome, Kyomachi Nagoya and Asano Ishikaw & Co, 49, Nichome Sakamachi Kobe; both of Japan. You would not be able to secure a foreign directory at so cheap rate. However you may try some of our advertisers.

1575. T. R. A, Trichur.—Various processes of extracting scents were discussed in September 1924 (Perfumery Special) issue of INDUSTRY. Process of distillation appeared in last July issue. Try to extract essence of Tulsi according to this process.

1579. S. S. V, Nainpuri—An article on paint manufacture appeared in April 1925 issue. Pigments may be bought of Bengal Paint and Varnish Works Ltd., 24, Strand Road; Dutt Bros. & Co, 38, Clive Street and Gopal Chunder Dass & Co, 94/1, Clive St., all of Calcutta.

1580. K. C. C, Pabna—Paper cutting and paper rolling machines may be bought of

SETT DEY & Co.

ORIGINAL HOMEOPATHIC PHARMACISTS,
42, Strand Road, Calcutta.

Dealers in Original Homoeopathic dilutions
and Biochemic Triturations.
Catalogue Free on Application.

Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

1581. K. A., Chitarpur.—Optical goods may be bought of Stevens & Co., Bow Bazar Street and Lawrence and Mayo, 16 Old House Corner, and James Murray, Government Place; all of Calcutta. Watch materials and tools may be bought of L. Basak & Co., 5 Old Court House Corner, Calcutta. Gold and silver threads may be bought of The India Gold Thread Mills Ltd., 191 Palace Road, Madura. Can supply old stamps.

1582. A. M. A., Delhi.—An article on phenyle manufacture appeared in October 1922 issue. For industrial books enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta.

1583. M. W., Calcutta.—Recipes of marking ink will be found in September 1923 issue: You may use mohua oil in place of coconut oil to your soap 35 deg. Be. indicates certain measure in hydrometer. Dissolve caustic soda in water so that the strength of the lye be 35 deg. in Beaume's hydrometer. Room temperature indicates ordinary temperature. For learning dyeing and bleaching you may write to the Principal, Government Weaving Institute, Serampore, Howrah.

1586. M. M., Delhi.—Catechu cannot be refined and its colour cannot be improved. Bones and bone dust may be bought of Standard Bone Mills, Chaulputtee Rd., Belliaghata, Calcutta. Horns may be supplied by Calcutta Horn Manufacturing Co., Post Box 808 Calcutta. Tin scrapes may be utilised in making small toys. Celluloid is not manufactured in India. Process of manufacturing patato celluloid appeared in July 1922 issue. Recipes of strike-any-where matches will be found in September 1923 issue. Fire works may be had of Orient Fire Works, 85/1 Upper Circular Road and Bonbonniere Ltd., 32, Dalhousie Square; both of Calcutta.

FOR THE COLD SEASON.

Woolen Danigol & Snuff and Navy Blue Colours Over Coat Rs. 12/8; Sporting Coat Rs. 9, Serge Coat Rs. 9/8, Cloth—Swadeshi, Finally Superior. Goods are smart looking serviceable and cheap. $\frac{1}{2}$ with order.

MAHINDRAKAR BROS.,
Bombay No. 4, or 12, & Poona City.

1589. V. J. M., Bilimora.—Chemicals you want may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. For manufacturing Zinc oxide and iron oxide go through a manual on chemistry. For manufacturing oil paint follow the formula step by step.

1591. K. C., Colombo.—For embroideries of required description try Hiralal Chhaganlal Chunilal Choksy, Post Box 38 and P. N. Kinariwala & Co., Saiyadpura; both of Surat.

1594. G. V. G., Cawnpore.—For industrial books enquire of Chackraverty Chatterjee & Co Ltd, 15, College Square, Calcutta.

1595. M. W., Calcutta.—No ink other than marking ink will be suitable for you. "Vela" is called cashewnut in English.

1596. B. P. D., Cawnpore.—Consult a physician.

1597. M. A., Negapatam.—Electric pocket lamps, bulbs, etc., may be bought of The Union Trading Co., 166, Harison Road, Calcutta; Vidyanand & Sons, Karachi and Mohamed Jeevabhoy & Co., Nizam Street, Bombay 9.

1598. N. V. B., Poona City.—Seek legal advice.

1599. N. D. B., Dera Ghazi Khan.—For sewing machine needles enquire of E. B. Bros. & Co., 11, Dharamtala Street, Calcutta. Method of preparing a duplicator appeared in August 1925 issue. Printing machines may be bought of Ashutosh Auddy & Sons, 16, Lower Chitpur Road, Calcutta.

1600. A. C. B., Simla.—For the required book enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta.

1601. K. F. R., Gadhra.—Refer your query to the High Commissioner for India, Grosvenor Garden, London. Or you may try to export your articles through some exporter such as Hassen Mamoojee, 22, Amratolla Street and Hajee Ajum Goola Hossen & Co., 12 Amratolla Lane; both of Calcutta.

1602. S. N., Puneekar.—Precipitated chalk may be used as base for tooth powder.

1603. M. A. R., Kymoré.—For litho printing write to Calcutta Fine Art Cottage, 76, Dharamtala Street, Calcutta. Carnauba wax

may be bought of S. N. De, Post Box 7851, Calcutta. Bees wax may be supplied by Madhab Chandra Daw, 4, Armenian Street, Calcutta. Nigrosine and bismark brown may be had of Amin Chand Mehra & Sons, 34, Armenian Street, and Hansraj Vishram & Co., 13, David Joseph Lane; both of Calcutta. Lamp black may be bought of Koylash Chunder Dutt & Sons, 20 Bonfields Lane, and Dutt Bros. & Co., 38, Clive Street; both of Calcutta.

1606. L. M, Tippgra.—Consult a good physician.

1607. M. M, Bilaspur.—Refer your query to the Principal, St. Xavier College, 30, Park St., Calcutta.

1608. K. N, Etah.—For industrial books enquire of Thacker Spink & Co., 3, Esplanade East, and Book Co., 4/4A, College Square; both of Calcutta. John Fowler & Co. Ltd, Post Box 654, Bombay and The Consolidated Pneumatic Tool Co, Ltd., Amarchand Bldg, Ballard Estate, Bombay deal in machines, tools, etc. Chemicals may be bought of The Eastern Chemical Co, Agents, Messrs Shaw Wallace & Co., 2, Ballard Estate and Standard Chemical Laboratory Works, 104, Cowasji Patel Street; both of Bombay.

1609. B. L. B, Jodhpur.—Cheap soap cannot be prepared without tallow. There is no process of manufacturing either laundry or toilet soaps at so cheap rate.

1610. J. V. N. R, Narsapur.—Sewing thread may be supplied by Finlayson Bonsfield & Co. Ltd., Johnstone; Turner Wright & Son Ltd., Orchard Street, Pendleton, Manchester and Copley Marshall & Co. Ltd., New Mill, Huddersfield; all of England. Oriental Machinery Supply Agency, 20/1, Lall Bazar Street, Calcutta may indent the required machine on your behalf. Wants to buy horn, ivory and seeds for making buttons.

1615. G. G. H, Goa.—Imitation pearl may be bought of Hiralal Nandala Kshetry, 38, Mugapatty, Bara Bazar, Calcutta. There is perhaps no aluminium button factory in India.

1619. G. B. P, Palana.—A colourless cement for joining sheets of mica is prepared as

follows: Clear gelatine is softened by soaking it in a little cold water, and the excess of water is pressed out by gently squeezing it in a cloth. It is then heated over a water bath until it begins to melt and just enough hot proof spirit (not in excess) stirred in to make it fluid. To each pint of this solution is gradually added, while stirring $\frac{1}{4}$ oz. of gum ammoniac and $1\frac{1}{2}$ oz. of rectified spirit. It must be warmed to liquefy it for use, and kept in stoppered bottles when not required. This cement, when properly prepared resists cold water. You cannot use casein in baking powder. Formula of patent medicines is kept as trade secret.

1625. R. S. B, Delhi.—Recipe of Mukhbilas will appear in an early issue. Pencils are supplied by Hand Pencil Co., Nurnberg, Bav. Schwabacher Strasse 81-83, Austria.

1626. S. A, J, Taungdwingyi.—Wants to know the Hindi equivalent of sabidilla seed.

1627. M. M. B, Bombay.—Soda ash and washing soda are one and the same thing. Process of sizing yarn appeared in July 1925 issue.

1628. V. S. N, Topputhurai.—Coconut coir and fibre extracting machines may be supplied by Thomas Larmuth & Co. Ltd., Todleben Iron Works, Salford, Manchester, England.

1629. M. L. G, Shwedaung.—Silks are produced mostly in Bengal, Assam and U. P. Silk may be supplied by S. S. Bagchi & Co., Khagra, Murshidabad; Murshidabad Silk Store, Jiaganj, Nimtolla Silk Factory, Ghatak, Dinapore; Annapurna Silk Weaving Factory, Benares,

BOMBAY DESHI OUSHADHALAYA.

Factory & Dispensary.

ASK FOR ANY FEVER

AGUE KILLER.

1 Phial as. 8

Doz. Rs. 5.

and our other popular remedies. Can be had everywhere at Cheapest Rate.

**PEARL & CO., Victoria Garden,
BOMBAY.**

Narain Das Bros, Raja Madholals Katra, Chowk, Benares and Dass Talukdar Agency, Strand Road, Gauhati, Assam.

1630. M. D. J, Tinsukia.—Electrical novelties may be had of K. G. Maniar, 55/1, Canning Street and S. C. Seal, 136, Upper Chitpur Road; both of Calcutta.

1631. H. P. S, Damoh.—Your query being in the nature of an advertisement should not be published in these columns.

1633. G. S, Kotah.—We have written to the firms as requested by you but they have not replied. It is advisable for you to try elsewhere.

1634. M. C. J. M, Madras.—There are many cotton mills at Bombay and Ahmedabad, some of which follow: (1) Birla Mills Ltd, Elphinstone Road, Bombay; (2) Diamond Spinning and Weaving Co. Ltd., 39-41, Appollo Street Fort, Bombay; (3) Dinshaw Petit Mills, 6, Hornby Row, Fort, Bombay; (4) Victoria Mills, 123, Esplanade Road, Bombay; (5) Ahmedabad Astodia Manufacturing Co. Ltd., Outside Astodia Gate, Ahmedabad and (6) Ahmedabad Sri Ramkrishna Mills Co. Ltd, Astodia Gate, Ahmedabad. Paints and varnishes are manufactured by Bengal Paint and Varnish Works Ltd, 24, Strand Road, Calcutta.

1635. N. L. D, Dacca.—For preserving ghee for long put in air-tight containers. Address of Hindusthan Review is 48, Bow Bazar Street, Calcutta. British Indian Crafts and Wealth of India have ceased their publication. Hindu, Mount Road and Madras Mail of Madras may serve your purpose. You may try Rangoon Times, 7, Merchant Street and Rangoon Gazette, 45/51, Sparks Street; both of Rangoon.

1636. A. M. S, Secunderabad—For industrial books enquire of Chackraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

LIMITATION OF FAMILY.

Third Ed. 5 Portraits, 55, Engravings.

357 Pages, Price Rs. 3, Postage Extra.

A comprehensive and Confidential Treatise. Every parent desiring to regulate the number of children according to his health and means will find it a god-send. Ask for table of detailed contents which will be sent free.

K. M. DAS & CO.

29-1, Telepara, Sampooker St., Calcutta.

1638. P. K, Mylapore.—Address of Prof. K. V. S. Nath is correct. Write him enclosing self-addressed envelope.

1639. C. H. R. S, Jowai.—Gold leaf, gold ink, gold powder, etc., may be utilised in gilding. Dyes may be supplied by Calcutta Chemical Co., Panditia Road, Ballygunge and Hansraj Vishram & Co., 13, David Joseph Lane; both of Calcutta.

1640. A. S. M. Sibi.—You may send your son to Maharaja Cossimbazar Polytechnic Institute, 1, Nandalal Bose Lane, Baghbazar, Calcutta for learning tailoring. For dyeing you may correspond with the Principal, Government Weaving Institute, Serampore, Howrah. For learning country herbs compounding you may get your son admitted at Astanga Ayurvedic Vidyalaya, 17/19, Shambazar Bridge Road, Calcutta.

1642. M. L. C., Khagra—Oils may be bought of Panchcowrie Tat, 5, Mirbaharghat Street and Anath Nath De, 3, Moidaputty; both of Calcutta.

1643. A. T. Z., Poona—The following are some of the technical institutes of Bombay Presidency:—The Old Victoria Jubilee Technical Institute, Bombay; The College of Engineering, Poona, The Agricultural College, Kirkee, Poona; The Victoria Jubilee Technical School, Poona; The Sir Jamsetjee Jijibhai School of Art, Bombay; The Victoria Jubilee Technical Institute, Sukkur, Sind; The Parekh Technical Institute, Surat, and The Ranchodlal Chotalal Technical Institute, Ahmedabad. For more complete list write to the Inspector of Technical Education of Bombay Presidency, Bombay.

1644. I. M. P., Bombay.—Sage leaf is known as Kafur-ka-patta and sesti in Bombay.

1645. B. C., Safidon—About Rs. 25,000 will be required for machineries and tools and another Rs. 25,000 will be necessary as working capital for starting ceramic industry.

1646. L. G. D., Dharwar—Bone black is prepared by carbonising all kinds of animal bones. For purifying gold you may use nitric acid. Your other queries appeared in the August issue under No. 1168.

1647. P. L. Matona—For rubber stamp making materials enquire of B N Bysack & Co, 1/1 Ram Chandra Ghose's Lane, P O Beadon Street, Calcutta

1648. Ralall Bazar, P O Box 608, Nairobi, Kenya Colony, Africa—Hosiery goods may be supplied by Genza, Wheeler & Co, and Wai San Knitting Co, both of Victoria Hongkong, China Silks may be supplied by China Silk Agency Co Ltd, and Little William & Co, both of Sanghai, China Socks etc may be bought of F B Bros & Co, 11, Dharamtala Street, Calcutta Crystallised silver nitrate may be prepared by dissolving grain silver in nitric acid diluted with about twice its weight of water, evaporating, the solution until it is strong enough to crystallise on cooling, and then allowing it to cool very slowly Wants to buy peacock feather fan

1650 M R C, Chagalmarr—For samples of calendar write to Maneklal Maganlal & Co, 7/9 Cowasji Patel Street, Bombay and Mahila Press, 31 Pataldanga Street, Calcutta

1651 A S T D, Moulmein—Process of enamelling iron plates appeared in March 1923 issue Locks, keys, hooks, etc, may be bought of Chas Ashton & Co, Grand Road near M E Mission, Aligarh and Banku Behari Dey, 113 Monohar Das Chowk, Bara Bazar, Calcutta Process of toning photographic papers will appear in an early issue

1652 M N S, Moulmein—A formula of good laundry soap appeared in the last July issue First work out the formula and report, if you find any difficulty it is not possible to give you required instruction

1654 A P C, Broach—Laundry tools may be supplied by Pioneer Mail Supply Co, 93/3, Clive Street, Calcutta An article on wood engraving appeared in October 1922 issue

1655 V R N R, Tanjore—We do not generally reply query letters by post unless furnished with necessary postage stamp

1657 H. I, Patna Junc—Refer your query to a geologist

1658. M. B. M., Rangoon—Violin strings of all descriptions may be supplied by E. Kunzel & Co Marknen Kirchen; Otto Windisch,

Schoneck i-Sa 50; Georg Krause, Marknenkirchen 21 and E Bruno Stark, Erlbach 57; all of Germany

1660 B S, Lahore—You may use white oil with vegetable oil to make it thinner. Process of colouring hair oils appeared in August 1925 issue According to individual taste scents also vary So you may use the scent you prefer Repeated use of amla oil turn grey hairs into black

1662 N C G, Darbhanga—Refer your first query to the Secretary, Association for the Advancement of Scientific studies of Indian students in Foreign countries, 10 Old Post Office Street, Calcutta There are many sugar factories in India, some of which follow (1) East Bengal Sugar Mills Co Ltd, 55, Ezra Street; (2) Champaran Sugar Co Ltd, 123/1, Halsey Road, Cawnpore, (3) Noori Sugar Works, Mairva, B & N W Ry, Dist Saran (4) Samastipur Central Sugar Co Ltd, Samastipur, Darbhanga, (5) Deccan Sugar and Akbari Co. Ltd, Parry's Bldgs, 1st Line Beach, Madras, (6) Punjab Sugar Mills Co Ltd, Lahore, (7) Cawnpore Sugar Works Ltd, 123/1, Halsey Road, Cawnpore and (9) Jaunpur Sugar Factory Ltd, Allahabad

1663 N S, Surguja—The Pitman's system of shorthand is mostly prevalent in our country For further particular refer your query to a shorthand expert Margarine may be called *nahal* ghee in Bengali To prepare black ink add 85 parts of sulphate of iron to 150 parts gall-nuts converted into a coarse powder Pour 4000 parts cold water over the two ingredients and let them digest for 24 to 48 hours, then strain through a cloth and dissolve in the filtrate 48 parts of gum-Arabic Mix 2 parts of tartar with one of powdered alum Rub the stained spot with this This will not injure the cloth

1664 G L G, Rawalpindi—Venus pencil may be supplied by Alpco Pencils Ltd, 173-5, Lower Clapton Road, London E S

1666 A C C, Kathiawar—Please write clearly for what purpose you wish to make insulated tape you may write to the Philatelic Society of India, 15, Burrows Street, Bombay.

1667. A. P. C., Broach.—Wants to be put in touch with the agent of St. Ledger's sweep.

1669. H. S., Bahraich.—Messrs. King Hamilton & Co, Kailaghata Street, Calcutta may make every arrangement for sending your goods to Akyab.

1670. S. A. C., Shanmuganathapuram.—Process of depositing iridium on gold nibs appeared in September 1922, issue. Process of ornamenting glass will be found in March 1925 issue.

1671. D. N. D., Hoshiarpur.—Patent medicines may be supplied by Martin and Harris, Waterloo Street, Calcutta.

1672. C. S., Palamcottah.—It is not possible to start a business without any capital You may however start some spare time work with a small capital

1673 S. Z H, Arrah.—Theoretical training is first essential When theoretical training is supplemented by practical training very satisfactory result is obtained For prospect in business practical knowledge is most essential. You may write to Oxford Correspondence College Ltd, St Giles, Oxford, England and International Correspondence Schools Box 3995, Serantan, Pennsylvania, U. S A

1674. M L B, Bundi.—Waste paper may be utilised in making paper pulp Acetic acid may be bought of Bengal Chemical and Pharmaceutical Works Ltd, 15, College Square, Calcutta Other chemicals you require may be had of B. K. Paul & Co. 3, Bonfields Lane, Calcutta.

1675. P. N., Madras.—For starting business with a small capital go through New Idea columns of INDUSTRY.

1676. S. J., Kurnool.—For industrial books enquire of Chakraverty Chatterjee & Co. Ltd, 15, College Square, Calcutta.

1678. S. E. H. E. S., Tanjore.—Perfumeries may be bought of Paradise Perfumery House, 75, Colootola Street, and Sickri & Co., 58½, Canning Street; both of Calcutta.

1679. G. S., Kotah.—Your queries have already been replied.

1680. S. R. P., Ayakudy.—Bears cigarettes may be bought of P. C. Banerjee & Sons,

B-90, Municipal Market, Calcutta. You need secure license for selling toy pistols. Bira may be bought of Moolji Sicka & Co., 57, Ezra St., Calcutta. Wants to be put in touch with camphor dealers of Bombay and Calcutta and snuff manufacturers of Dharanghadhara.

1681. D. S. S., Rawalpindi.—Corrugated Cardboards may be bought of Packing Material Co., Ag James Luke & Sons, 4, Old Court House Lane, Calcutta.

1682. P. S. R., Hospet.—For ferro-prussiate printing works, enquire of Bengal Miscellaneous Ltd, 99, Manicktala Main Road, Calcutta

1683. M. A. B., Bombay.—Silk piece-goods may be supplied by Little William & Co., Shanghai, China; Davis & Co., Yokohama, 208, Japan; Koga shomasuke, 106 Aioche—che, Yokohama, Japan; Cerf Georges, rue Pizay 16, Lyons and Debenham & Co, quai St. Clair, 6, Lyons, France

1684 D K D, Sirsi.—Piece-goods may be bought of Hazarimall Sardarmull, 78, Clive Street and Fulchand Banamali & Co., 72, Canning Street; both of Calcutta. Khaddar may be supplied by Khadi Pratisthan, 15, College Square Calcutta. Your other enquiries being in the nature of an advertisement should not be published in these columns.

1686. J. H. S., Tavoy.—Can supply wolfram ore.

1687. A. K. Mhow.—For the required book enquire of G. A. Natesan & Co, 3, 4, Sunkuramachetty Street, Madras.

1688 M. O. M., Belgaum.—Mohua oil is not used for edible purposes.

1691. P. V. H., Coimbatore.—You may consult Sanskrit Sahitya Parishat Patrika, Shambazar Bridge Road, Calcutta. Sanskrit books may be bought of Sanskrit Pustakalaya, 58, Cornwallis Street, Calcutta. All the old copies of INDUSTRY are not available; last three or four volumes only are available. As regards advertisers you may correspond direct with them for particulars.

1692. B. B. S., Nazim Sambhar.—For jewellers' tools enquire of L. Bajack & Co., 5, Old Court House Corner, Calcutta. For

industrial and technological books enquire of Thacker Spink & Co., 3, Esplanade East Calcutta.

1693. C. M, Mangalore.—Your previous letter is not traceable.

1694. T. B. S, Kottapeta.—Laundry machines may be bought of Symington Cox & Co., Mercantile Building, Calcutta. The firm will also supply you with necessary information and estimates.

1697. A. P. M. Bishnupur.—For estimates of tube wells write to City Tube Well Co, Kuver Ltd, 84, Clive Street and Texas Tube Well Co, 5, Dalhousie Square; both of Calcutta. For flour mills enquire of Burn & Co, 7, Hastings Street, Calcutta.

1698. M. H, Suriandli.—Your enquiry is unintelligible.

1701. G. S, Kotah.—It will be advisable for you to import the goods through some importing firms. Otherwise you will have to undergo various difficulties as you are new in the line. For this purpose you may write to Singh Sircar & Co., 125, Harrison Road, Calcutta. One renten mark is equal to about 1 shilling.

1702. T. N, Chapra.—For forwarding goods you may correspond with King Hamilton & Co, Koilaghata Street, Calcutta.

1703. M. A. K, Mainpuri.—Wants to be put in touch with ghee dealers of Calcutta.

1704. A. D, Madura.—Indian Cookery is published from Egmore, Madras.

1705. A. S, Kandukur.—The trend of the cotton market in foreign countries is uncertain hence it is very difficult to gauge the future prospect of cotton trade.

1707. A. P. R. S. A. S, Sivakasi.—Recipes of damp-proof matches will be found in September 1923 issue.

1708. S. V. S. N. R, Masulipatam.—You may use brass sheet in preparing the apparatus for ice making. You should consult a mechanical engineer for this purpose.

1710. B. S. K. M, Uppada.—Indian addresses will be found in Thacker Indian Directory to be had of Thacker Spink & Co., 3, Esplanade East Calcutta.

1711. B. B. L. K. L, Amballa City.—You may use soap solution for cleansing artificial ivory articles. Tools may be supplied by Buck Joseph, 56, Holborn Viaduct, London, E. C1; L. S. Starrett & Co., Anthol, Massachusetts, U. S. A. and Carl. Aug. Jager, Steinbach Hallenberg, Thuringen, Germany. Cycles may be supplied by Aberdall Cycle Co, 61, Essex Road, London N 1; Act Ges. Varm. Frister and Rossmann, S O Skalitzerstrasse 134, Berlin, Germany and B E Manufacturing Co., 18 W, 18th Street, New York, U. S. A. Watches are manufactured by Nivia Watch Co., Viatte and Guenin, Bienut Madretsch and E. Suter and cie, Bienue; both of Switzerland. Gramophones are manufactured by N. Harris and Sons, 19, Victoria Park Square, London, E 2; Gramophone Co. Ltd, George Street, Balsall Heath, Birmingham, England and Homophone Company G m b H, S. W Alexandrinenstrasse 108, Berlin, Germany.

1712. R. C D, Ahmedabad.—Mineral oils may be bought of Anath Nath Dey, 3, Moidaputty, Barabazar, Calcutta.

1713. A P, Bombay.—Requires the address of Danish Egg Exporters' Association.

1714. A M B, Chandernagar.—Recipes of handkerchief essences will be found in September 1924 issue of INDUSTRY. For hair oil you may go through booklet on Hair Oil Manufacture published from this office.

1715. N. R. C, Bangalore City.—Your enquiry being in the nature of an advertisement should not be published in these pages.

1716. G S, Lahore Cantt.—For disposing of gunny bags advertise in pages of newspapers and periodicals. Please write clearly your requirements.

German Aniline Dyes, and Chemicals
of the well-known manufacturers
Messrs. Leopold Cassella & Co.,
 Largely consumed by big Industries, such as
 Jute, Silk, Cotton, Wool, Leather,
 Paper, Inks, etc.
 —STOCKISTS—
Messrs. Fazlhussein & Brother,
 44, Armenian Street,
CALCUTTA.

1717. P. M. V. P, Rangoon.—Tanned leather may be bought of Bengal Tannery Co., 17, Gorachand Road, Entally, Calcutta and National Tannery Co. Ltd., Pagladanga, Entally, Calcutta. For suit case accessories go through the advertising pages of INDUSTRY.

1719. B. T, Davangere.—Can supply Neem oil in very large quantities.

1721. D. M. P. S, Etawah.—Most probably your canvas bag cannot be mended

1722. M. A, Negapatam.—Formula of rubber stamp ink will be found in July 1923 issue.

1723. A. H, Jacobabad.—Rubber can be vulcanized but it cannot be melted Recipe of hectographic ink appeared in June 1924 issue Wants to be put in touch with dealers in khaddar and coloured glass phials.

1725 K. V. K, Masulipatam.—For degree write to Universal University, Allahabad

1726 S. C, Nadiad.—Neat foot oil may be bought of B. K. Paul & Co, 1-3, Bonfields Lane, Calcutta.

1727. K. S, Godavari.—For starting prospective small industries go through September 1923 issue of INDUSTRY.

1729. K. M. C, Karachi.—No such powder is known to us.

1731. D. B, Delhi.—Art exhibitions are held in the beginning of every year Photographic apparatuses may be supplied by Calcutta Camera House, Chowringhee, Calcutta. At present there is no chance of rise in gold market You may consult B. K. Bhattacharya, Jyotirbhusan, 370, Upper Chitpur Road on astrological matters. It is very difficult to say which of the

homeopathic colleges is the best. For particulars regarding advertisement write direct to the advertiser. Your other enquiries are not in our line.

1733. N. S Sialkot.—Two articles one on glass manufacture and the other on drug manufacture will appear in an early issue of INDUSTRY.

1734. N N, Ramchandrapuram.—To correspond with querists, write them with name and number under care of INDUSTRY when your letters will be duly redirected. Refer your query regarding stone breakers to Burn & Co., 7, Hastings Street, Calcutta. Oil engines may be supplied by Heatly and Gresham Ltd., 9, Waterloo Street, Calcutta. Red ochre yellow ochre, ferric oxide and gypsum are largely used in paints. Super-phosphate phosphatic deposits and bones are used in manure and mica and quartz are used in electrical purposes. Copper sulphate has various chemical uses. For disposing of articles mentioned by you advertise in pages of newspapers and periodicals.

1735. S. M. J. A, Agra—you may write to Oriental Industrial Co., 9, Bonfields Lane, Calcutta for the chemical you require. You may consult Kelly's World Directory to be had of Kelly's Directories Ltd., 182-184 High Holborn, London W. C.

1736. G. S., Kotah.—Vide No. 1707 above.

1737 K. S., Gujranwala.—White oil may be supplied by Atlantic Refining Co., Philadelphia, Pennsylvania, U. S. A. and Union Petroleum Co., Philadelphia, Pennsylvania U. S. A. Wools may be supplied by Deutsche Wollges m. b. H., Markgrafenstrasse 77, Berlin and Diamant & Co, Beiden, Mhrenstrasse 79, Hamburg; both of Germany. Addresses of cycle dealers of Germany appear elsewhere in this issue.

1738. B. R. M. C., Coimbatore.—The ingredients used in preparing natural colour may be bought of Banshidhar Dutt & Sons, 126, Khengraputty, Bara Bazar, Calcutta.

1739. S. A. C., Sharmuganathapuram.—You may learn French and German at Calcutta University, College Street, Calcutta.

Which do you Prefer ?

Children following each other on close heels or taking birth at intervals of 5 to 10 years according to your will.

IF THE LATTER

then get a copy of that wonderful book "Control over Birth" for in its pages you will find fourteen methods for avoiding unnecessary conception and a dozen for getting a male or a female child at will.

The whole mystery has been laid bare by means of illustrations.

Price per copy Re. 14/- only including postage.

BRIJMOHAN & CO.,

Katra Nihal Singh, Amritsar, (Punjab)..

1740. J. R. G., Nasirabad.—The stains of grease and paint may be removed from hats by means of turpentine or benzine and if the turpentine leaves a mark finish with a little alcohol. For removing ink stain soak the portion affected in lemon juice and rub well then wash with soap. Requires mohua and groundnut in very large quantities.

1741. P. L. B., Tatanagar.—You may go through soap making by Mr. A. Watt to be had of Chackraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

1742. G. P., Motihari.—Sock making machines may be supplied by Economic Hosiery Mills Ltd., 55-2, Dharamtala Street, Calcutta.

1743. M. B., Bhavnagar.—It is very difficult to say which company in foreign countries will take agate, jasper, quartz, etc. However you may correspond with Pruyt Tinch & Co., Inc, Glens Falls, New York, U. S. A.

1745. M. B. H., Darbhanga.—See under No. 1393 in September issue of INDUSTRY. Wants to be an apprentice in an engineering firm.

1748. G. B. D., Jalpaiguri.—Envelope making machines may be supplied by Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta.

1749. J. A. D., Lucknow.—An agricultural expert wants a job in an agricultural farm

1750. M. H. M., Bassein.—Addresses of leather dealers appear elsewhere in this issue. • Wants to be put in touch with the agent of Farbenfabriken vorm. Friedr. Bayer & Co., Leverkusen Germany.

1751. B. N., Bellary.—For Singer sewing machine write to Singer Sewing Machine Co, Esplanade, Calcutta. For other sewing machines go through the Sale and Exchange pages of INDUSTRY.

1752. I. C., Bombay.—To communicate with any querist write him with number and initial under care of INDUSTRY when your letter will be duly redirected. For reference of the firm write to the firm direct. Requires flax seed and ginseng root.

1753. S. A. C., Shanmuganathapuram. Following is the list of foreign trade journals.

Swiss Exporter, Chamber of Commerce, Berne, Switzerland; La Vie Technique Industrielle, 18 Rue Segnier, Paris. Manchester Guardian Commercial, 43 Fleet Street, London E. C. 4; Uebersee Post, 10, Solomanstrasse, Leipzig, Germany; Norwegian Trade Review published by the Trade Intelligence Bureau of Norway, Christiania, Norway; Canadian Export Pioneer, 110, Street Martin's Lane, London W. C. 2; Commercial America, 34th Street, below Spruce Philadelphia, U. S. A.; The Empire Mail, 212, High Holborn, London W. 4; The Czechoslovak Trade Journal, P. O. Box 476, Prague, Czechoslovakia; The Journal of Commerce, Garaers City Press, Gardenvale, Quebec, Canada.

1754. T. N., Bhimavaram.—Toileting articles may be supplied by B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

1758. G. D., Savankvadi.—For sharpening tools enquire of T. E. Thomson & Co., 9, Esplanade East, Calcutta.

1759. B. G. R., Raipur.—Vide No. 1753 above.

1760. D. N. M., Dadu Sihe.—Annatto seeds, lodh wood, Brazil wood, etc., may be bought of Madhab Ch. Daw, 4, Armenian Street and Bansidhar Dutt & Sons, 126, Khengraputty, Bara Bazar; both Calcutta. Hindi equivalent of annatto is "watkhana"; arrowroot is "tickhur" and lodh is applied in Hindi also. Brazil wood being foreign product its vernacular equivalent is not known.

1761. P. C. S., Jhang.—Wants an expert in jam making.

1763. K. B. S., Alwar.—Oil engines may be supplied by Heatly and Ghresham Ltd., 9, Waterloo Street, Calcutta. Sugar making machineries may be supplied by Burn & Co., 7, Hastings Street, Calcutta.

1764. K. S. S., Delhi.—For starting business with small capital go through New Idea Columns of INDUSTRY.

1766. S. K. S., Sattur.—Match machine may be supplied by Bhawani Engineering & Trading Co., 122/1, Upper Circular Road and Bengal Small Industries Co., 91, Durga Charan Mitter Street; both of Calcutta. Match chemi-

cals may be supplied by Oriental Industrial Co., 9, Bonfields Lane, Calcutta. Match splints are also supplied by the above two machinery suppliers.

1767. R. T., Partabgarh.—You perhaps use water soluble colour. But by the use of oil soluble colour better colour may be obtained.

1768. S. P. W., Kurnegala.—Printing types may be supplied by American Type Founders Co., Jersey City, New Jersey, U. S. A. and Hamilton Manufacturing Co., Two Rivers, Wisconsin, U. S. A. Printing machines may be supplied by Babcock Printing Press Manufacturing Co., New London, Connecticut and Seybold Machine Co., Dayton, Ohio; both of U. S. A. You may consult Printers' Ink, New York, U. S. A.

1769. E. M. R., Shillong.—Try to get yourself admitted in an engineering college.

1772. D. F., Larkana.—Tallow and lard may be supplied by Calcutta Tallow Mart, 19, Tirettra Bazar Street, Calcutta. Soap chemicals may be bought of Calcutta Chemical Co., 351, Panditia Road, Ballygunge, Calcutta. Dyes may be had of Amin Chand Mehra & Sons, 34, Armenian Street, Calcutta. Your suggestion regarding oil is impracticable.

1773. A. Louis, 37, Norris Road, Singapore.—Hats may be supplied by Imperial Sola Hat Manufacturing Co., 18, Charnac Street; Eastern Hat Manufacturing Co., 61 Charackdanga Road, Beliaghata; Mohamed Hassen, 53, Ezra Street and Premier Hat Manufacturing Co., 11, Baloochukak Lane, Ballygunge; all of Calcutta. Wants to be put in touch with "ghee" and dhol dealers of Calcutta.

1775. C. L. G., Bareilly.—For glass sheets enquire of Abdoolkar Moola Ebrahimjee, 296, Abdul Rehman Street; Mohamedally Allibhoy Kachwalla & Co., 220-23 Abdul Rehman Street and M. P. Mehta & Co., 92, Chakla Street; all of Bombay. Picture frames and coloured pictures may be bought of King & Co., 21, Badra Mohal, Hornby Road, Fort; Star Art Training Works, 40 Medows Street, Fort and Bombay Fine Art Gallery, 69, Esplanade Road; all of Bombay.

1776. H. C. C. S., Patna.—For securing agencies go through the Sale and Exchange pages of INDUSTRY.

1777. A. S. K. J., Munar.—As old and worn out gramophone records are useless, so it is not possible to exchange them for new ones.

1778. P. L., Ralangi.—Your enquiry is outside the scope of our journal.

1779. T. R. F., Secunderabad.—For nettings used in curtain enquire of Beharilal Lachmi Narain, 188, Cross Street and Chunilal Sewchand Roy, 152, Cross Street; both of Calcutta.

1782. P. D. V., Karera.—Can supply bones in very large quantities.

1783. R. R., Saugor.—Please explain what you mean by bleaching catechu. It is not possible to silver mirror by electricity only.

1784. R. C. B., Dhar.—Can supply ajwan oil and ajwan phool.

1785. B. P. B. P., Motihari.—Machineries for rice mill may be supplied by Marshall Sons, & Co. Ltd, 99, Clive Street, Calcutta. Write them direct for catalogues, etc.

1787. P. N. K., Batate.—Rasout is very efficacious in the treatment of ophthalmia.

1789. V. L. R., Cuddapah.—The full address of Mr. K. S. V. Nath is Sivaganga, Pudukotah.

1790. Illegible.—Thank you for your suggestion.

1791. C. C., Dhar.—Process of preparing crystallized thymol will be found in December 1921 issue of INDUSTRY.

1792. K. V., Sitamau.—Laboratory requisites may be supplied by Bengal Chemical and Pharmaceutical Works Ltd., 15, College Square and Bengal Scientific Supplies Co., 29, College Street Market; both of Calcutta.

1793. S. M. H., Patna.—As you are new in the line it will be advisable for you to import the articles through some importing firms such as Singh Sarkar & Co., 125, Harrison Road and Laurel Novelty Co., 43, Park Street; both of Calcutta.

Notices and Reviews.

Picture Cards

Messrs. Mathews Venkadathu Bros. Vithapally Street, Kottayam, Travancore are importing nice coloured picture cards from U. S. A.

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The rubber stamp ink prepared by H. L. Home is of good quality and pleasant colour. We recommend our readers to give the ink a trial which may be had of Mr. N. L. Dutt, 26, Bangla Bazar, Dacca

A Juvenile Magazine.

Biswabarta (World News in Bengali) Office:—Student Library, Behala, Calcutta.

The stories, anecdotes, puzzles, etc., which are a regular feature of this juvenile magazine, will be found entertaining and instructive and as such will be appreciated by Bengali children.

Hindi Magazines.

"Nipun Vyapari" published from Delhi.

There are useful articles on industry, trade enterprise, business and the like besides formulas, recipes, etc.

"Arogya Darpan" published from Ritchi Road, Ahmedabad.

A Hindi journal on health and hygiene.

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Sometimes it is intended to have one's letterheads, seals, cards, monograms etc., embossed instead of printed plain. This may be effected with the help of embossing machines supplied by Mr. J. D. Lam importer of specialities, Post Box 709, Bombay, India. Dies, suitably engraved, can be easily fitted in these machines. Mr. Lam has been kind enough to send us a machine bearing our own inscriptions.

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We acknowledge with thanks the receipt of carbon paper and double-coloured typewriter ribbons from Messrs. Chandulal Chunilal & Co., 94-96 Cawasji Patel, Fort, Bombay.

Ink Powder.

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Floral Essence.

The flower essences presented to us by the Star Trading Association, Bangalore City have given us entire satisfaction. Our readers should try the firm for perfumery and toilet requisites.

Pain Balms.

Persons suffering from rheumatism etc., will be glad to learn that pain balms possessing medicinal virtues are prepared by Messrs. S. P. K. Kader Mphideen Bros., 149, 150 S. B Bazar, Rangoon.

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1649. Kanhaya Lal, Secy. A. V. School, Gabhana, Dist. Aligarh—Requires rice sugar, yarn and mill cloths and can supply white and black wool, mango wood and butter.

1665. T. D. Radrigo & Bros., 67, Bankshall Street, Colombo, Ceylon—want to be introduced to dealers in vanilla seeds.

1690. Md. Sikendar Bhuian Co., The Burmah Oil Co. Ltd., Badarpurghat Sylhet—wants a capitalist to start jute or sugarcane cultivation at Badarpurghat.

1699. Cargills & Co, Woriur, Trichinopoly—Desire to be put in touch with Sumatra and Indian cigar dealers in Calcutta.

1706. K. Ramakrishnaiya Lecturer, M. R. College, Vizianagram—wants to be put in touch with dealers in cane or rattan

1757. Khetsidas Chamaria, Burwar, B. N. Ry.—Requires the service of a mistry who can make trunks and buckets.

1781. B. G. Dadina, Shaikhothman, Aden—Desires to be introduced to pure Himalayan Shilajit dealers.

1788. S. H. Hussain & Sons, Sadar Baza, Lucknow.—Requires Malacca and other canes.

1850. Varshney Metal Works, Varshney Bldgs, Aligarh—want services of an expert in enamelling sign plates.

1851. G. D. Rakaur, Khas Jharia Dobari Colliery, P. O. Jharia, Dist. Manbhum—can supply white clay in very large quantities.

1876. U. C. Paul, Badarpurghat, supply orange in very large quantities and wants regular supply of secondhand winter coats, vests and other coats.

1918. Srikishen Khanna & Co., Katra Ahluwalia, Amritsar—can supply kuth or catechu in very large quantities.

1963. S. M. F. Rahman Shah & Co, Residency P. W. D. Imperial, Indore wants to be put in touch with suppliers of agar-batti.

1966. Eleford & Co., Royapettah, Madras Desire to be put in touch with suppliers of clipped cleaned cowtail hair and lizard skins and buyers of squirrel skins.

1972. Maung Shway Thwin, Moulmein, Burma.—wants to be put in touch with German firms who import tinned fruit products of Burma, such as pine apples, guava jellies, pickles and ginger preserves etc.

1979 H. P. Sinhamalu, Railway Dispensary, Wuntho, Burma—Desires to be introduced to cloth and sari merchants of Bangalore and Salem.

1987 Janak Singh Jagadish Narayan Singh Jharia—want to be put in touch with suppliers of rejected railway sleepers and purchasers of linseed, kusum flowers and ghee of Ballia.

NOVEMBER ISSUE OF INDUSTRY.

(In the Press)

The November issue of INDUSTRY, which will appear on the first day of the month will contain articles on Bee-keeping, Plantain and Banana Industry, Silk Industry, etc., in addition to the usual features such as New Ideas, small Trades, Formulas. Any friend of our subscribers may get a copy free as sample on application to the Manager, Industry, Keshub Bhaban, Shambazar, Calcutta

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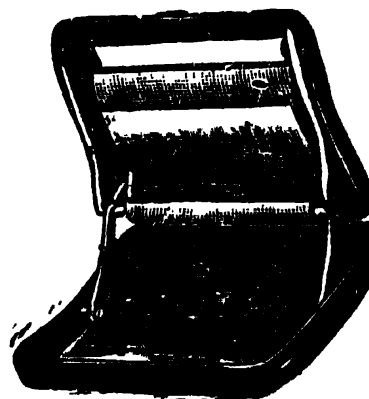
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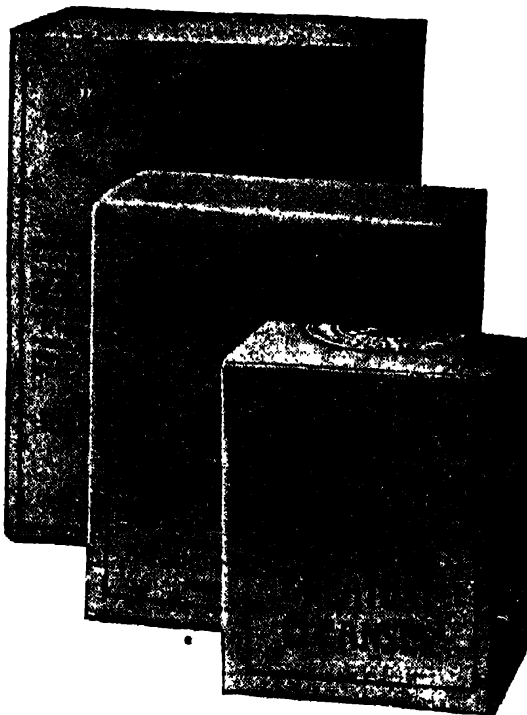
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Industry

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VOL. XVI.

CALCUTTA, NOVEMBER, 1925.

NO 188

THE UNEMPLOYED.

THE unemployment question is eating into our vitals. It has become nation wide and is going down to its bottom.

The unemployed have become the burden of our society—already overburdened, and suffering from mediocre income.

Suggestions are prolific for their relief. The University has founded a chair. The Industries Department appointed a committee. Educational colony is the principal suggestion of one; technical education the recommendation of the other.

Good suggestions these are, they will relieve some of the unemployed—indeed, but they cannot relieve a whole nation. The whole nation is starving—not only a few of its educated and articulate elements.

Besides, schemes requiring capital are beyond the capacity of the Nation. Co-operative agriculture has been tried but failed. Technical education will give a

few employment only unless the country is prepared to lay huge capital to start industries, big enough to employ technical experts.

There is opportunity and necessity of starting technical industries not only to provide means of employment but to save the country from economic ruin. But if you cannot provide capital in proportion as you turn up technical graduates, the unemployment question would be keener.

Still you can provide small number of berths immensely inadequate for the wide spread unemployment difficulties.

Requirement of the people is primarily food, and this is produced in the villages. If you can make it cheap there by organising its production in quantity much more than is necessary, you can make the villages self contained and the people would not rush to the town for money and employment.

Let everyone of the village work in productive industry, productive agricul-

ture, productive dairy and fish culture. Let every inch of land be brought under cultivation, every home produce some article. Let the educated few of the villages co-operate with the unlettered masses and instruct them and work out with them the modern methods and unemployment question will be solved without much noise.

Our cultivators produce rice, wheat, jute and such other articles which bring them ready money. The foreigners purchase them at high price. The staple food goes out of the village and gradually out of the country. The cultivators get some ready money but the whole village loses its food. Thus people are compelled to come out to the town and increase the unemployed rank.

The money which goes to the cultivators comes out again for purchasing foreign trinkets at high price and as soon as the coffer is empty the rank of labour unemployed is swelled.

Whatever sphere of employment is created for the educated few is inadequate for the yearly growing university turn-outs. To this mass of educated unemployed, the labourers have joined.

Rice is exported, wheat is exported. Unless you can control their export you cannot control their price. Let however people find out other food as a supplementary substitute for those. You can supplement these by fish, by fruit, by poultry products, by dairy products, by cattle products. Most of these are not exportable and hence the price could be low unless the produce is scanty and not controlled by a ring. And if the people

can get their food at home, they will not go out for employment.

You need not clash with existing occupations. Form into co-operative associations as many as you can but never be disheartened by smallness of your members. Secure a waste pond, waste land which are rather danger to the village sanitation. Between yourselves secure some money. If you have no other work, work yourself to re-excavate the waste pond, reclaim the waste land. Take care to so arrange that your pond is full during the rains by leading the rain water drain of a suitably wide area into your pond. You require the aid of your education to do this. You require common sense acquired in the schools to do this.

Cultivate fish in the pond, fruit and vegetable in the land. They will give sufficient supplementary food not only for the families of co-operative members but of other villagers at a low rate. And as you extend there will not be an inch of waste land left without clashing with existing occupations and production.

You can similarly carry out cow rearing and milking, cattle rearing, poultry keeping, and thus supply the co-operative members and your villagers with cheap and plentiful supply of milk, egg, meat, etc.

Every scheme for the relief of the unemployed should not only be proportionate to the need of the country but also to the capacity of the country. We need not have elaborate self-sacrifice but only self-help in which every one can join to help himself as a co-partner with others.

We must not require any help from outside—must not send our boys to beg—a pernicious custom to make our young hopefuls a race of mendicants but so much taken resort to by our political guides.

The prosperity of the country must come from within—and not from without. If you have any industry in your village try to develop it by developing the equipment of your artisans, you need not send out your money, if you have

any, to establish a big plant in a crowded town to supplement yours and then send out your artisans as labourers.

An elaborate scheme for the unemployed by a practical exponent will be detailed in a special issue of INDUSTRY at an early date which will immensely interest the employed and the unemployed of the country. The problem is a national question, its solution should interest the whole nation—not a portion of it

HAVE YOU ANY DAY DREAMS?

Now is your opportunity to change it into facts.

Indeed all people—men and women alike—have their day dreams sometimes; but the competent ones try to change these dreams into facts.

Many there are who keep their dreams to themselves as stories and fancies. They never try to make them come true.

There are thousands of people who are in the habit of chucking their day dreams out of their minds and filling them up with racing, drinking and scandal—if not with privation, misery and hopelessness.

But your dreams are pioneers of your success if you have confidence in your capacity, courage to look facts in the bright side.

See if this issue of INDUSTRY points any way towards realising this capacity and write us which portions of it show you the easiest way to fructify YOUR dreams.

DRY BATTERY AND ELECTRIC BELL.

DRY BATTERY.

THE primary battery with its numerous modifications owe their origin to a physical experiment made with some few strips of metal and salt or acidulated water. It was not, however, until the noted French physicist M. Leclanche invented the simple battery which still bears his name that electric bells and telephones came into general use. Until the Leclanche battery was invented the Daniell battery was generally used for electrical work, and it still occupies the premier position in the telegraph service to-day.

Admitting the superiority of the Leclanche to all other batteries for light intermittent work, it has to contend in recent years a formidable rival in the small, neat, compact little cylinders of zinc which are known as "Dry Batteries." Strictly speaking, the name dry battery is a misnomer, as the probability is that if the batteries were perfectly dry there would be no current obtainable therefrom.

Nearly all dry batteries are more or less modifications of the Leclanche wet battery. Thus, in a simple cell we have first the coating paste, a mixture of chloride of ammonium, plaster-of-Paris and water, which takes the place of the saturated solution of sal-ammoniac in the Leclanche. Next to this comes the depolarising mixture which is generally made of carbon or graphite, manganese peroxide, chloride of ammonium, and some non-drying agent, such as glycerine, to keep the mixture moist. This mixture

represents the porous cell filled with broken gas carbon and peroxide of manganese in equal quantities, almost universally used by makers of Leclanche batteries. A carbon plate is placed in this mixture, and forms the negative terminal of the cell, while a wire soldered to the outer containing case forms the positive terminal, which is equivalent to the zinc rod in the wet type of cell.

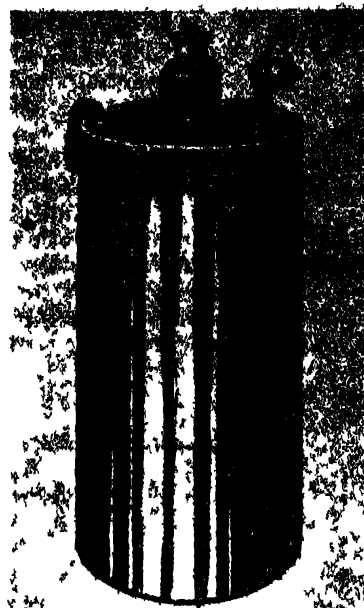
It will be seen that here we have all the constituents of a Leclanche cell in a slightly different form, different makers using widely different quantities of materials; but the basis of all is principally the same. Some makers use a special depolariser in the manufacture of their cells. The voltage of dry batteries varies considerably, some cells only giving an electromotive force of one volt while others give 1.56 volts. The electromotive force of the cells naturally runs down after use, but many dry cells possess considerably recuperative powers, so that, when left on open circuit, the voltage rises gradually till it almost reaches its initial value.

A few hints on the manufacture of dry cells at home will now be given. It should however, be remembered that the results obtained from such cells will not correspond with those purchased ready made, as these are made in large quantities with costly and special machinery. Small lamps can be lighted with these cells the voltage of which will be about 1.3. By the following methods three best home-made cells may be made.

(1) Procure a sheet of ordinary clean zinc, measuring 6 in. by 9 in., bend this round a wooden pole to make a cylinder 6 in. by 3 in., cut a circle of zinc to make a bottom, and solder the whole together, including a short length of soft-tinned copper wire over the seam to make the terminal from zinc. Next proceed to this pot with a mixture of plaster-of-Paris or gypsum and sal-ammoniac, a few drops of glycerine, and about $\frac{1}{2}$ pint of rain water or distilled water. This should be coated over the inside and bottom of the zinc pot to a depth of $\frac{1}{2}$ in., take a good close grain, consolidated carbon plate, $1\frac{1}{2}$ in. by 6 in. by $\frac{3}{8}$ in. thick, drill a hole 1 in. from the top in the centre for the terminal, place a pad of rubber, ebonite or glass in the cylinder, and stand the plate thereon, and pack the intervening space with a mixture made up of the following materials: 2lb crushed carbon, 1lb peroxide of manganese, $\frac{1}{2}$ lb sal-ammoniac, 1 tea-spoonful of chloride of zinc, and $\frac{1}{2}$ teaspoonful of glycerine.

This mixture will probably be enough for two or three cells. If the materials are not already damp, a very little water may be added, but only just enough to make the mixture feel slightly damp. When this has been well mixed and packed in, the cell should be carefully cleaned out to a depth of 1 in. from the top (great care being taken that the black mixture does not overlap the white), and the space filled up with melted sulphur or should it be preferred, melted sulphur and pitch in equal proportions.

The whole cell should now be coated over the black enamel. By the addition



• DRY BATTERY.

of a brass terminal the cell is complete. Paraffined paper may be wrapped round it in the absence of insulating card cylinders.

(2) Make the cylinder the size required, and procure a carbon plate large enough to leave $\frac{1}{2}$ in. between carbon and zinc pot, and 1 in. at the top; next make a paste of the consistency of cream of plaster-of-Paris, to which add about one-eighth the quantity of powdered sal-ammoniac and sulphate of zinc in equal proportions, and coat the inside of the cylinder with the following mixture and allow same to set; place the carbon plate in, and pack around same with the following mixture: coarsely powdered oxide of manganese, 5 parts, graphite (carbon), 75 parts; sal-ammoniac, 20 parts, and a little water. Seal up the cell in the former manner.

(3) Make a zinc case as above. The white lining consists of: Plaster of Paris, 25 parts; ammonium chloride, 10 parts;

water, 55 parts Black mixture Powdered graphite 75 parts; manganese oxide, 10 parts; chloride of zinc, 5 parts; chloride of ammonium, 10 parts; glycerine, 2 parts To be used as before

The batteries should be kept in a moderately warm room, damp causes the salts to creep and destroys the connections. A good plan when connecting up cells permanently is to coat the whole of the cells, including the terminals, with hot paraffin wax; this effectively prevents damp salts from arising.

ELECTRIC BELL.

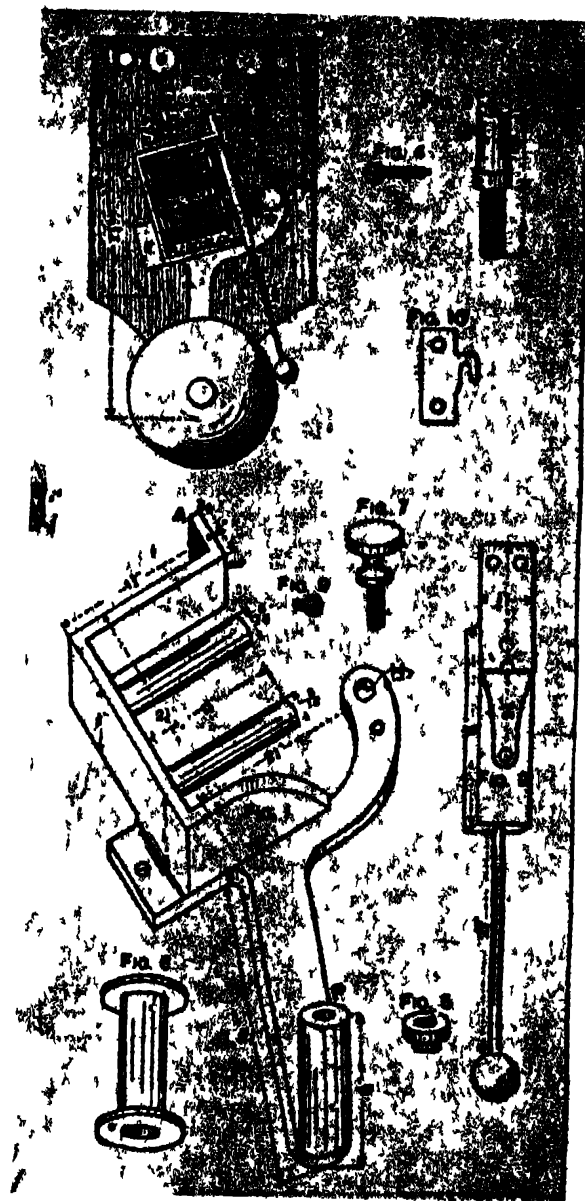
Electric Bells have now a days been put to a number of uses, to call persons, to establish communication between the different storeys of a building and the like Simple in construction, they are easily put together, and as the various parts can be bought ready made, no great mechanical skill is required in making a bell

The different parts of an electric bell are shown in the accompanying illustration Fig 1 shows the malleable iron casting, which serves the double purpose of a support for all the working parts and the electro-magnet for the bell A sheet-iron frame to this shape may be easily made The cores of the electro-magnet should be made of round soft iron $1\frac{1}{8}$ in by $5\frac{1}{16}$ in, and screwed into a lug on the frame, turned up to form a yoke for the magnet.

Fig. 2 shows the armature, hammer, and contact spring in one piece The armature is of soft iron $1\frac{1}{8}$ in. by $\frac{1}{4}$ in, the contact spring is made of thin steel with a stud of platinum on the end coming in contact with the screw of the

contact pillar. The hammer is a small brass ball fixed to a shaft of iron wire screwed into the armature.

Fig 3 shows the contact pillar. It is merely a piece of brass rod turned, to the form shown A small hole is drilled and



ELECTRIC BELL.

Fig 1 Casting for Frame. Fig. 2 Armature, Hammer and Contact Spring. Fig. 3 Contact Pillar. Fig 4 Contact Screw. Fig. 5 Insulating Collar. Fig. 6 Bobbin. Fig. 7. Gong Screw. Fig 8 Bell Complete. Fig. 9 Screw to secure Armature Spring. Fig. 10. Brass Hook for Cover of Bell.

tapped in this to receive the contact screw (Fig. 4); the top of the pillar is then slit with a hack-saw down to this hole, and a hole for another screw is drilled across this slit near the top of the pillar. When this transverse screw is tightened, the contact screw is held tightly and cannot shake loose. The contact screw must be tipped with platinum to prevent corrosion of this part by the electric spark. A small hole is drilled in the end of the brass screw, and a scrap of platinum wire is sweated in this hole. The stem of the contact pillar must be insulated from the iron frame of the bell. This is done by bushing the hole, H, with an ebonite, boxwood, or vulcanised fibre collar (shown at Fig. 5). A similar collar at the bottom insulates a brass nut which holds the pillar firmly to the frame.

Fig. 6 shows one of the boxwood bobbins, made to fit tight on the iron cores of the electro-magnet. The length of each should be $1\frac{1}{4}$ in., the diameter $\frac{3}{4}$ in. and the thickness of body $1\frac{1}{16}$ in. Each bobbin should have 1 oz. of silk-covered wire wound regularly on it as a reel of cotton is wound. The bobbins are to be fitted on the cores, the two inside ends of the wire coils stripped of their covering cleaned, twisted together, and soldered. One of the outside ends must be connected to the projection A (shown at Fig. 1.) and the other carried to one of the terminal screws, as shown in Fig. 8.

Fig. 7 shows the brass screw which passes through a plain hole in the crown of the gong and screws into the top of the pillar, P (shown in Fig. 1) in this set of castings the bell pillar, to support the gong, forms a part of the frame, together

with the bell metal, nickel-plated $2\frac{1}{2}$ in. gong.

The pillar can be turned out of a bit of iron or brass rod and fixed to the frame.

Fig. 8 shows all the parts mounted on a base of polished walnut or teak. This base is $7\frac{1}{4}$ in. in extreme length, 5 in. at the sides, 4 in. at the end, and $\frac{3}{4}$ in. in thickness. Two holes for holding screws are drilled through the corners and bushed with brass, and two terminal building screws are mounted between them. One wire goes from one of these terminals to the contact pillar and the other wire goes to one end of the magnet coils. A neat cover of polished walnut or teak protects all the working parts from dust. This cover is held in position on the base by two brass hooks, shaped as shown at Fig. 10.

THE ART OF BEE-KEEPING.

OF the agricultural industries the dairy, the piggery, the poultry yard, and the orchard have all more or less come to the front, and between them in many cases go far towards supplying human needs. But besides the industries mentioned bee-keeping ought to receive more attention as a farm industry than has hitherto been devoted to it. Many instances can be cited of its having been cultivated with the best results. It is an industry peculiarly adapted for a place on the farm as is indicated by the ancient and sacred association of "milk and honey."

In Europe and America bee-keeping already occupies a prominent place

among rural industries, and is generally most successful when associated with farming. In those countries it has been discovered that success depends on the neighbourhood of clover-fields. Again, these "small cattle" are so independent of offences that they have unlimited right of pasturage. It is to be seen that what they lack in bulk, they compensate for in energy and in strength of numbers, so that the results of their labours are, under proper conditions, out of all proportions to their 'stature'. The possibilities that lie in bee-keeping have been indicated and the times are opportune for commencing this industry. Now-a-days the hives and appliances are simple in construction and moderately priced too. Moreover there is a market for money.

Bee-keeping like other rural employments requires the application of a good deal of acquired information. One may, however, commence practice and the study of principles at the same time -- that is, commencing on a small scale, and increasing one's stocks as one's knowledge and ability advance. The limits of our space here forbid anything more than a digest of the knowledge any one may easily acquire more fully from books and experience.

APPLIANCES.

To begin with one's requisites may be sufficiently supplied by the possession of a hat-veil, a smoker, a supply of hives, with the necessary frames, crates, and sections and a stock of comb-foundations.

HAT-VEIL.—The veil is simply a yard and a half of black hexagon net,

sewed up one seam with an elastic band, to go round a broad-brimmed hat, on lower edge to be tucked away inside the vest.

SMOKER.—The smoker is a bellows contrivance for burning rags, brown paper, or touch wood in such a way as to permit of directing a stream of smoke upon the bees when they are to be handled. A loosely tied roll of rag may serve a turn instead or the fumes of tobacco may be utilised by those who can use the pipe. This frightens and quiets the bees.

HIVES.—The hives should be of simple construction, each body made to hold not more than eleven frames.

The frames should be of the standard size used in the neighbourhood, hung in the hives, so that ten of them occupy a space of 14½ inches, that being also the dimension of the hive the other way.

SECTIONS.—Sections are those neat dovetailed boxes to hold one or two pounds of honey comb, and are generally imported.

CRATES.—Crates are the bottomless boxes or trays in which the sections are arranged in groups of 21 or less according to size.

COMB FOUNDATION.—Comb-foundations are sheets of beeswax impressed with the exact form of the cells as made by the bees. These are turned out by special machinery, and are a great help both in supplying the bees with material of which to build combs and in compelling them to build them straight in the frames or sections where wanted, at the same time putting it in the power of

the bee-keeper to limit the production of useless drones.

OTHER APPLIANCES.—A few other minor appliances might be found useful, though not absolutely necessary, such as a queen cage or two, some queen-excluding zinc, bottle-feeders and a honey-knife. The cast carpets or blanket about the house will supply all the quilts needed for a commencement.

HONEY-EXTRACTOR.—The question of having the rather expensive machine for employing combs without breaking them called the honey extractor—may be deferred till experience warrants the expense.

MANAGEMENT.

DRIVING BEES.—The first concern of those commencing should be, as soon as may be best, to get their bees domiciled in the new frame-hives. It is quite easy for experts to transfer both bees and combs from the one to the other at almost any season. The bees are 'driven' into an empty skep, the combs are then cut out, pierced and tied into the new frames, these, with the bees, are then placed in the new hives, when they soon fix all nicely up.

NEW SWARMS.—If natural swarms be got, they should be treated thus: the first that comes off should be placed in the new hive on the stool where the skep stood, the latter being removed to a new location. This causes many more bees, accustomed to the old place to join the swarm and strengthen it. The likelihood is that the skep will not swarm again. Should it do so, the swarm should be returned, and more ventilation given, as a preventive, till the 21st day from first

swarming when all brood will have been hatched out.

A second good bar-frame can now be had by driving all the bees and transferring any combs found straight and sweet. It is not advisable to make more than two stocks from one.

RAPID INCREASE OF STOCKS.—To those anxious to increase their stocks as much as possible, it is a good plan to rear or purchase spare queens, so as to be able to introduce one into each skep as soon as it has been removed from its old place and queen. In that case the same process of stocking new hives may be carried out at the rate of one every fortnight or three weeks during the honey season.

In backward and ungenial season less must be expected and, indeed, it is common to leave the skep in place on the first hive until all its brood is hatched out, when it is taken and treated as a honey super.

Bees require different treatments at different seasons of the year.

WINTER.

The great secret of successful wintering is in keeping the bees in as quiet a state and as constant a temperature as possible. Of course abundant supplies are the first consideration to this end, the next is careful packing and ventilation, and the third is to let them rest free from the least disturbance till the first of spring.

On no account should bees be actually shut in, as they often get into such a state as to suffocate. Only tempt them to stay at home when it is dangerous for them to be out.

SPRING.

Provided all goes well in wintering there is really no necessity for disturbing the bees during early spring. It is about this time that they recommence breeding and their stores thereafter more rapidly diminish, but they ought to have sufficient left them in autumn to carry them through till the first new honey is to be got, or till fruit trees are in bloom.

Liquid foods should not be given unless the desperate cases, when it may be poured into empty combs and hung in the hive.

CONTINUOUS TREATMENT.—As the beekeeper's summer may be considered as commencing with the swarming season, whatever style of treatment may be adopted, in view of getting hives filled with bees and brood, should be continued without intermission till that period arrives. That is, care must be taken to see that once the bees have got started in earnest to brood-rearing there should be suffered no check from want of food or room. Both should be given in moderation, yet continuously; when plenty of natural stores are coming in, leave well alone, but supplement these either by bottle-feeding whenever the weather is unsuitable for out-door work or by uncapping portions of their sealed stores every day or two.

Pea meal may be given as an equivalent or supplement to natural pollen when that is deficient, the meal being sprinkled on shavings in an old skep set to face the sun in a sheltered corner. Room need only be given where combs have previously been removed, by adding one at a time in the centre of the brood-

nest, as the bees are able to cover all closely. So soon as the hive is full of bees from side to side, with brood in every frame, the summer treatment should begin.

SUMMER.

Before proceeding further it should at first be settled whether the various stocks are to be worked for (1) increase, or (2) honey.

WORKING FOR HONEY.—If the latter, it has to be decided whether it is for extracted or comb honey. Every preparation should be made accordingly. New hives, ready fitted to receive swarms, should be prepared before hand, upper storeys filled with spare combs or foundation for extracting purposes, and crates ready fitted with guided sections for comb honey.

WORKING FOR INCREASE OF STOCKS.—If increase be wanted, some such plan should be followed as indicated on preliminary management.

To prevent swarming, or at least reduce it to the lowest as a natural impulse see that the bees have plenty of doorway and plenty of room for storage and for clustering inside.

SECURING HONEY.—To get either extracted or comb honey well ripened and sealed, at least two upper storeys or crates of sections to each hive will be required.

AUTUMN.

The autumn treatment generally includes part of the honey harvest—viz., the heather.

HEATHER HONEY.—The secret is, barring the weather, to have only strong stocks, and to make them warmer by

soft coverings than during the earlier season. When swarming has been allowed *ad libitum*, neither swarms nor old stocks are fit to do much in the ways of surplus. Stocks previously worked for extracting are best of all. They have always more bees left than those which have been worked for comb.

Heather honey will not have the combs in the extractor but has to be broken up and pressed; nor does it sell so well as in the comb.

BEE PLUNDERING—Not a drop of honey or bit of comb should be left anywhere within their reach, for if once started, the bees get on at once for plunder; and so vicious do they then become, that the apiary is a place to be dreaded by man and beast. As soon as the surplus honey is taken, and that under every precaution, all hives should be closely though not warmly covered, doorways contracted a little, and left alone till early winter.

Necessary operations should be done towards evening, when flying bees have all gone home. If food be needed, either as a result of a poor season, or of the honey having nearly all been stored in supers, it should be given rapidly as soon as the supers are taken away, and before the time of dearth and robbery has come.

Queenless stocks should be attended to, weak hives united till strong, and all left to settle till the time for winter treatment arrives.

FOODS FOR BEES.

LIQUID FOOD FOR BEES.—Boil together 5 lb. white sugar and 1 quart of water, a few minutes' boiling will suffice.

It is improved by boiling with it a pinch of cream of tartar. This is the proper food for autumn, spring food may have a half more water, and the tartar omitted.

SUGAR-CAKE FOR BEES IN WINTER.—Boil together 5 lb. white sugar, less than a pint of water, and a pinch of cream of tartar, until a drop cooled on a plate stiffens so as to draw out as a thread. Take off the fire and set in a cool place, or in cold water, stirring briskly until the mass begins to cool and turn white and thick. Then pour out on three sheets of paper laid in flat dinner-plates. When cold, the cakes should be white and firm, yet not hard.

SPRING FOOD—For early spring food, handful of flour for each pound of sugar may be stirred in shortly before pouring out.

CALCIUM CARBIDE.

CARBIDE of calcium is the product of combining lime with coal, or to be more definite, of the metal calcium, of which lime is the oxide, with carbon. It is about 30 years ago that this product became known to the world as an industrial product and if it had not been discovered earlier in the retorts of the alchemists and metallurgists, it was because this combination to be effectual necessitated a degree of temperature that electricity alone can produce. It is therefore a condition precedent that one must employ an absolutely modern electric furnace for the manufacture of carbide.

In nature, carbide of calcium cannot exist on the surface of the earth since it is destroyed by the slightest dampness.

It is a simple stone which possesses this paradoxical property of unassailability by acids and by the most active deoxidising agents, entirely incombustible by itself, it is decomposed by the most ordinary and common liquids, producing acetylene by water.

The manufacture of carbide consists in mixing together coal and quicklime according to the proportions given by the chemical formulas of the process in quantities of 56 parts of lime to 36 of coal and in dissolving this mixture in the electric furnace. This latter is a simple cavity inclosed with refractory walls, into which one induces a strong electric current by the electrodes, enormous carbons of a very pure and compact coal which, at a great conductivity, has the property of resisting the high temperatures of the furnace. When the mixture has been put into the furnace the arc is started between the electrodes and under the influence of the heat developed, the lime is melted. In the bath thus formed, the coal then reduces the lime and, whilst on the one hand it fixes the oxygen of the lime producing a continual clearance of oxide of carbon which is burnt up in the open air, on the other hand it unites itself to the freed calcium to make a composition which is none other than carbide of calcium.

At the beginning of the industry this operation used to be carried on in a closed vessel, and little by little all the mixture contained in the furnace was transformed in a block of carbide which was then cleaned and the gauge and slag taken off it. But very soon this system was abandoned in order to adopt the blast furnaces into which the mixture of lime and coal was continually being placed and the carbide produced was then taken out at regular intervals, say, every hour. The technic of carbide has approached in a marked degree that of the blast furnace, and it was then decided to increase the capacity of the furnaces.

This development has not been made without employing all the resources of modern technic and the engineers have

led to solve a series of problems. It was necessary to fight against the destructive effects of such sources of heat, to furnish all the metallic parts of the machine with a water circulation, to have recourse to the most perfected mechanical methods in the handling of these masses.

During the first years of its appearance, the consumption of carbide was not much more than a few hundred tons per annum. Then the favour that acetylene met with caused the building of manufactories, increasing in number continually. It was the period when the hydro-electric works began to become general, thanks to the development of the electrical industry and new uses for the power were sought for actively.

For some long time, the applications of carbide were limited almost exclusively to the production of acetylene and rarely have there been two industries so closely united, since all the carbide was employed in producing acetylene and there is no other means of producing acetylene for industrial purposes other than in separating the carbide. But this parallelism between the production of carbide and that of acetylene does not extend to their respective geographical distribution. The regions endowed with abundant hydraulic force become the centres of production, whilst the centres of consumption depend upon totally different factors.

A great impulse has been lent to the production of carbide by the application of this product to the manufacture of chemical products and in the first place of cyanamide. This azotic fertilizer manufactured by direct action of azote on the carbide, in special furnaces, has gained little by little a large place and thousands of tons are manufactured yearly. Now a ton of cyanamide requires about 800 kilos of carbide. The carbide, at the side of cyanamide, transformed into acetylene, serves to transform the chlorine bye products which constitute first class non-inflammable solvents, for the manufacture of acetic acid and aldehydes used for production of synthetic alcohol.

THE WILD SILK INDUSTRY.

SERICULTURE, or the art of Silk Industry derives its name from 'Seres', the primitive inhabitants of Southern China from where it originated and which is also known as the cradle of the silk worm; for nearly five thousand years ago her people discovered and began to produce silk. They were the first who made a very great progress in its manufacture also.

Silk was introduced into India long before the hey-day of the Roman Empire and the East India Company carried a considerable trade in this article. From verses in the Rigveda, it is evident that our people (Hindus) have been using silk from the earliest times on all ceremonial occasions, marriages, festivals, religious functions, etc. Some assert that at least one or two varieties of the worms are indigenous to the regions adjoining the Himalayas.

Mention must once more be made that the silk industry in India falls under two important and distinct sections, viz., the Domesticated mulberry-feeding and the Wild or Non-mulberry-feeding worms. The first section was fully dealt in the article on Mulberry Silk Industry which appeared in the February and June 1925 issues of *INDUSTRY* and now let me deal with the other section of the subject.

In India, generally four species of worms, are reared, viz., the common or mulberry silk worm belonging to the first section and the *Muga*, the *Tasar* and the *Eri*, which are of commercial value, belong to the wild or second section. But



Fig. 1. Silk Worm, Moth and Cocoon.

it is important to mention here that the so-called wild worms have been for centuries completely domesticated both in India and Assam. Of course there are various classes of silk worms which spin cocoons out of which silk is obtained. They come under two main groups the Bombycidae and the Attacidae, only the former make reelable cocoons and the domesticated worms belong to this family.

The silk worm is an astoundingly rare creation and an ungainly looking insect of a remarkable organism and has twelve eyes, sixteen feet, eighteen breathing orifices, a powerful mouth and an equally powerful stomach; whose work is in contradistinction to its appearance.

It is one of the productions of nature whose utility exceeds its beauty.

MUGA SILK.

The muga silk worm feeds on the leaves of several trees but the Sum, *Machilus odoratissima* and the Suala, *Tetranthera monopetala* are the common trees upon which they can be permanently reared. Both these trees occur exclusively in Assam. The silk worm is domesticated in Assam, being reared in house to a certain extent but found to produce better and productive cocoons when left to shift for itself on the trees around the cultivator's house. The Suala is never cultivated and is found commonly in the village waste lands. The Sum is cultivated either in groves or simply on the embankments near homesteads. The leaves become fit for use when the trees are a year or two old but it is customary not to use them before 3 or 4 years. Muga is a multivoltine worm having five broods in a year which are distinguished by the following vernacular names:—

- (i) *Katia*—autumn crop.
- (ii) *Jarna*—winter crop.
- (iii) *Jethna*—hot weather crop.
- (iv) *Ahera*—early rains crop.
- (v) *Bhadia*—late rains crop.

The insect is found in every stage of growth at all times of the year and the last crop supplies seed cocoons. The co-

coons are of golden yellow colour, and in size about $1\frac{1}{4}$ in. long by 1 in. in diameter. The silk content varies a good deal depending upon the season of crop; the first being the best of all.

BREEDING—The cocoons selected for breeding are safely hung up within the house placed in trays of bamboo splits. The moths begin to emerge in the evening and pair shortly after. The females are recognisable by their bulkier body. The male moth consorts with the female for about 24 hours and flies away leaving its mate. Then the female moth commences to deposit eggs. Eggs laid after the third day are rejected and each moth lays on an average 250 eggs. They ought to be kept in the dark as much as possible and hatched from seven to ten days. On being hatched the worm is about a quarter of an inch long; it appears composed of alternate black and yellow rings. The worms pass through 4 moultings, and remain motionless for about 36 hours at each moult. The full-grown worm measures about 5 inches long and thick like a finger when it is known *pucca*. At the end of the fourth moult the worm exhibits a voracious appetite and grows rapidly. The ripe muga is now full of the gelatinous matter with which the worm spins its silken cocoon.

PROCESS.—The worms are then placed on a *jali*, with a bundle of leafy branches with dry leaves attached into which the worms crawl. Four to seven days are required in spinning the cocoons and are plucked from the *jali* before the moths emerge. Unlike others the muga silk sun so the chrysalides inside are stifled by worm cannot be killed by exposure to the

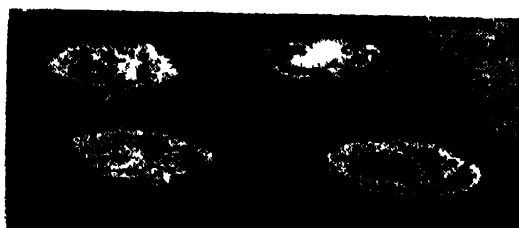


Fig. 2. Silk Worm Eggs.



Fig. 3. Silk Worms reared in trays.

placing the cocoons over a fire and are boiled in an alkaline solution. When required for reeling their floss is plucked off and they are placed in tepid water.

YIELD.—An acre of Sum contains nearly 100 trees and may produce a maximum outturn of one lakh cocoons but the average yield is taken a quarter of that. Nearly 5,000 cocoons give one seer of silk and no part of the muga cocoon is rejected as useless. The cloth woven from muga yarn has a bright yellow colour and stands washing much better than other silks keeping gloss and colour to the last.

TASAR SILK.

Bhagalpore, in the province of Bihar is the home of Tasar Silk Industry and mention must be made of the Silk Institute of the place aided by the Government where attempts are being made to rear the four species of the Indian silk worm and to make it a successful centre of the Indian Silk Industry.

The Tasar silk moth has two crops a year. The first is the *Bhadeli* crop coming in the month of August and the

second or the *Kartika* crop coming in the month of October. The rearing of the tasar cocoons occupies about 5 months in a year commencing from the bursting of *Dhaba* cocoons in June to the sale of *hartic* crop in October. The cocoons are collected in the jungle and sold to rearers.

Large flat cocoons are selected as seed and are placed in baskets. The insects come out of the cocoons during night and the males soon discover the females and begin pairing. Within 24 hours after their coming out, the females long narrow mouths, lined with fresh are placed in closed baskets ending in leaves. In the course of a day the moths commence to deposit eggs and lay from 50 to 200 during the first three days and perish in eight or ten days more. The eggs are small white flattened oval bodies, deposited in masses which often adhere together. On the ninth day the eggs are small white flattened oval the worm immediately on emerging commences to eat the leaves lining the basket. The baskets are now, suspended on the tree and the worm soon attacks the fresh leaves. It moults five times, at intervals of from 5 to 8 days and commences to construct its cocoon in about 36 to 40 days. When full-grown it is about 4 inches in length and is of a pale green colour. The cocoon is almost perfectly oval, smooth, of a grey colour, with darker lines reticulating across its outer surface. The average size is $1\frac{1}{2}$ in. long and $1\frac{1}{4}$ in. broad.

REELING.—The cocoons are boiled for an hour in an iron vessel containing water and a small piece of potash dissolved in it. Then they are transferred to a clean

pot pouring off the alkaline water where they are left standing exposed to the sun for over three days. They are again similarly boiled in water on the fourth day and poured into a basket to cool. Care must be taken to protect the cocoons being burnt while boiling. They are next washed with cold water and spread out when they are finally ready to be reeled within six hours. While being reeled the tasar cocoons are not placed in hot water but are left quite dry, dancing about in an open basket. The first and finest thread is called *Lak* and the coarse thread goes by the name of *Jhur*.

ERI SILK

The generally cultivated species of Eri in India are respectively *Attacus ricini*

and *Attacus synthia* and the insect is multi-voltine producing seven broods in the year. The big crops are reared from September to November and in February and March because the climatic conditions are then ideal. The cocoon of the first variety is a loose white one; that of the latter a smooth compact brown one.

The eri worms feed on (i) castor (vernacular *Endi* whence the nomenclature of the silk) which grows about the villages and (2) the *Keseru* a wild or cultivated tree found near the villages. The castor is the best food and is mostly used.

The seed cocoons which can be had in the bazar are spread out in a thin layer in a bamboo basket or thread on a string



Fig. 4. Improved Reeling Machine.

and are suspended from the roof until the moths emerge and pair. The paired moths are carefully removed and placed on reeds or sticks to which the female moths are tied. The pairs are then taken up and placed on a hanging cloth to which the moths readily adhere with their legs. The males are separated and the females allowed to lay eggs for three days which are picked off and wrapped in a piece of cloth and hung up from the roof.

When young worms begin to hatch out the cloth containing the eggs is spread out on a bamboo tray and tender leaves of castor or *Keseru* torn into shreds are scattered to feed the worms. When the offshoots travel on to the leaves they are transferred to the feeding tray. The worms feed, grow and cast their skins four times. The mature worm is either white or green and either spotted or spotless. On attaining maturity the worms crawl up to the top of the bundles, when they are picked off and placed in a *jali*, a medium for spinning, usually consisting of dry plaintain leaves bundled up and suspended from the roof. Thereafter the worms begin to spin and complete the cocoons in three to six days. They are finally gathered and stifled by exposure to the sun. The eri cocoon varies much in size and weight and is not a completely closed shell like that of the muga; also unlike the others it is unreelable.

The ultimate fibre of the eri cocoon is however a stronger and more lasting than either the mulberry or the tasar. Also eri silk cloth is much more valuable than either *matka* or *ketha* cloth and therefore has a great demand. The eri worm

is easily reared and it feeds on the castor plant found at random so it can be advantageously tried by the villagers or ambitious cultivators, with a very little capital.

DISEASES AND ENEMIES.

The wild worms are also subjected to several bacterial diseases which affect the mulberry worms. The many and varied enemies are rats, mice, ants and mosquitoes. Of birds the crow, the kite, the bat, the sparrow all cause damage. The eri suffers fly pest and flacherie. The wild breed of worms are rarely subject to internal disease, but their insect pests and tormentors are very numerous.

REELING.

The illustration (Fig. 4.) shows the improved reeling machine described in Vol 15, pp. 531, 532 of INDUSTRY. The mulberry as well as the muga and the tasar cocoons can be reeled on this appliance with or without *croisseur*. One thread 'single' contains 5 to 6 filaments of univoltine and 10 to 12 filaments of multi-voltine cocoons according to the required denier.

STANDARD NUMBER OF COCOONS FOR DIFFERENT DENIERS.

The upper layer of all cocoons contains filaments of greater diameter than the lower layer so that the diameter of the filaments of 4 or 5 thick cocoons is equal to the diameter of 6 or 7 thin cocoons. The multivoltine races of India have $1\frac{1}{2}$ to $2\frac{1}{2}$ deniers but the univoltine races have 2 to 4 deniers. Generally speaking, thick cocoons have thick filaments and thin cocoons have thin filaments. The following table shows the number of thick, and thin cocoons to be

taken to produce threads of any required denier.

Denier of one cocoon	Denier of raw silk wanted	No. of cocoons to be thrown	thick cocoons to be thrown	No. of thin cocoons to be thrown
1½-2	8	3	plus	2
	9	4	"	1
	10	5	"	0
	11	0	"	7
	12	4	"	3
	13	6	"	1
	14	5	"	3
	15	4	"	5
	16	8	"	0
	17	8	"	1
	18	7	"	3
	19	8	"	2
	20	3	"	10
2 2½	8	2	"	2
	9	3	"	1
	10	4	"	0
	10	0	"	5
	11	3	"	2
	12	5	"	0
	13	3	"	3
	14	4	"	2
	15	4	"	3
	15	5	"	2
2½-3	8	2	"	2
	9	3	"	1
	10	3	"	2
	11	4	"	1
	12	4	"	2
	13	3	"	3
	14	4	"	3
	15	5	"	2

and so on.

RE-REELING.

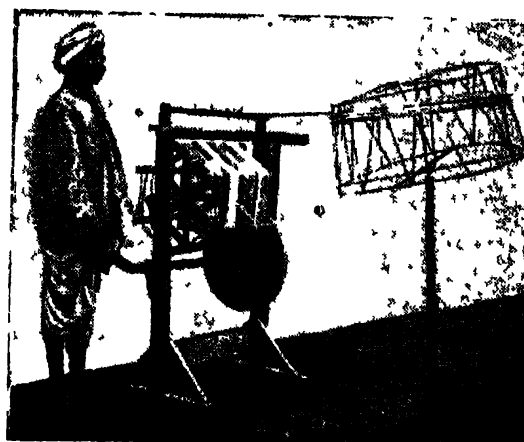
For export raw silk should be re-reeled on a re-reeling machine (Fig.5) but for home consumption re-reeling is

not necessary. There is a great demand for good reeled and re-reeled silk in Europe and America. Re-reeling can be done on the Bengal reeling machine after cutting a skein on a *cherky*. Three or four skeins can be re-reeled easily at a time by small boys or girls.

The process is as follows. One skein of silk (1) is placed on a *cherky* (2). The end of the skein is passed through the hook of the guider (3) and then tied to the reel (4). Now if the reel is turned the silk will be wound on the reel.

THE CHEMICAL COMPOSITION OF SILK.

Under microscopic and chemical examination of the natural fibre of silk it is found to consist chiefly of Fibroin and Serecin. Both are composed of four elements; carbon, hydrogen, nitrogen and oxygen. There is rather a large proportion of hydrogen and oxygen in serecin than in fibroin. In addition to these a very trifling amount of waxy and more or less colouring matter are found. Serecin is always found on the surface of the fibre and commonly goes under the name of silk gum.



5. Re-reeling Machine.

After boiling, the fibre assumes the appearance of pure silk, freed from the gum, with its pearly lustre and soft brilliance. The wax and colouring matter disappear in the boiling, together with silk gum.

CONCLUSION.

In a country like India where over 90 per cent. of population form peasantry there can be no real economic progress unless agricultural occupation be supplemented by industrial pursuits. Again to make for efficiency in either, co-operative organisations are necessary. If all the technical persons employed in the various branches of silk industry co-operate, then there is every reason to hope for brilliant industrial future and a huge economic structure of India. Progress may be greatly hastened as in Japan if the State helps the pioneers by starting new centres and protecting them during their infant stage. They can even restrict or levy heavy duty on imported silk. This closes the natural silk section of sericulture and the artificial silk section will be dealt in a separate article.

All interested readers who wish to take up the line may communicate with the contributor, who will give free advice and information as far as possible.

—By Mr. E. Lakkaraju Naidu,
Chemo House,
Kharida Bazar Road,
Kharagpur.

MANUFACTURE OF VERMILION.

(By a Practical Expert)

VERMILION is that well-known red substance which is employed to bedeck the parted hair on the forehead by Hindu married females. It is essentially a sulphide of mercury, specially treated, and commands a wide sale. In its purest form it is generally imported from China, hence the preference for "Chinese Vermilion". We have already in early issues of *INDUSTRY* furnished recipes for preparing this article which by the way is costly. We now append some formulas for manufacturing cheaper varieties. The processes described conform more to indigenous Ayurvêdic preparation.

METHOD OF MANUFACTURE.

(1)

Take one seer *hingul* and finely pound in a stone mortar. Then macerate the powder with the juice of 25 sour lime of the *gora* variety to form a paste. Place the paste on a porcelain dish out in the sun. Pound the dry cake thus obtained into impalpable powder and the product will be good vermilion.

(2)

Take lead filing and realgar in equal parts and macerate with betel-leaf juice. Put the paste into an earthen pot closing the mouth with a covering of mud on the lid. Then apply heat to it by burning pure cowdung cakes in a special kind of furnace known as *gajapul*. The product when cool will be referred to below as 'prepared lead powder'.

Take 1 sr. of this prepared lead powder and mix thoroughly with 1 sr. lead sulphide.

A *gajaput* furnace is made by digging a hole in the ground 2 cubits deep and 2 cubits in diameter. The fuel for this is furnished by naturally dried cowdung cakes.

(3)

Mix together thoroughly 1 poa pure flower of sulphur and $\frac{1}{2}$ poa pure mercury in an iron mortar. The result will be a black substance known in commerce as black sulphuret of mercury.

Now apply gentle heat to the above in an iron pan. The colour will change to red. When cool powder this red product finely and it will give vermilion.

(4)

A cheaper quality of vermilion may be obtained by grinding together finely $2\frac{1}{2}$ srs. of white lead powder and 5 srs. of the vermilion as prepared in Recipe No. 3 above.

(5)

Melt $2\frac{1}{2}$ srs. zinc in an iron pan over fire. Now throw in an equal part of turmeric powder and stir with a stick of *neem* wood. The turmeric powder will be burnt to ashes and combine with molten zinc. Next throw in an equal part of the powder of bark of *aswatha* tree and stir as before. This powder of bark will also combine with the molten mass. Then take a similar measure of *trifala* and *jeera* powder in equal parts and throw in the pan and stir. The molten mass will gradually solidify and become brittle. This will be referred to as "prepared zinc powder".

When cool take one seer of this "prepared zinc powder", 1 sr. lead sulphide and 1 sr. *hingul* powder. Grind the three together into a fine mixture.

(6)

Take 5 srs. of "prepared zinc powder", 7 srs. of finely powdered vermilion dye, 4 srs. of lead sulphide; pound these together thoroughly in a stone mortar for half an hour. The impalpable powder thus obtained will be a good product.

(7)

Take "prepared lead powder" 10 srs., *hingul* powder of the best quality 5 srs., vermilion dye in fine powder 6 srs. Pound these ingredients together and mix thoroughly. Set aside for 24 hours and then pound again. Store the product in a cool place. It will match the real Chinese vermilion.

(8)

Take in an iron pan 50 oz. of pure mercury, 8 oz. 2 dr. of pure sulphur; macerate the two together thoroughly. When a uniform paste is obtained apply heat to melt it. Remove from fire and cover up closely with another vessel, and allow to cool. Great care must be taken in applying the heat so that the mixture may not catch fire. Moreover the fumes of mercury are poisonous so that one must be extremely cautious in manipulating these operations. Next powder the cake obtained above and melt it in a closed pan. Remove when the bottom of the pan becomes red. When cool macerate the product with water to purify it and finally dry.

(9)

Take 600 parts of pure mercury and 228 parts of pure sulphur; macerate the two ingredients together for several hours until a black paste is formed. Now dissolve 150 parts of caustic potash in 500

parts of water and add the solution gradually to the amalgam obtained above. Continue to macerate all the while. Now put the mixture in an iron pan and place on the fire. Stir continuously and add water intermittently. When it becomes red the fire is slowed down. Finally when cool, the product is macerated with water as in (8). The product will appear exactly like Chinese vermilion.

(10)

Take 2 srs. of "prepared lead powder" and 3 srs. of vermilion No. (9). Mix these two together and grind thoroughly. Then mix 1 sr. red lead with the above and incorporate thoroughly. The product will be a cheap variety of vermilion.

(11)

Take $4\frac{1}{2}$ srs. of "prepared zinc powder", $2\frac{1}{2}$ srs. of No. (8) vermilion, 4 srs. of fine powder of vermilion dye, and $1\frac{1}{2}$ srs. of red lead. Macerate these ingredients all together in an iron mortar for 1 hour. When a good vermilion will be yielded.

(12)

Take 4 srs. of red lead powder, $2\frac{1}{2}$ srs. of prepared zinc powder, $\frac{1}{2}$ sr. of Venetian red No. 1 powder, and 1 sr. vermilion dye. Macerate these ingredients thoroughly in a stone mortar and set aside for 24 hours in a cool place. Finally pound it and use.

(13)

Take $2\frac{1}{2}$ srs. of chrome yellow, 1 sr. of prepared zinc powder, $\frac{1}{2}$ sr. red lead, $\frac{1}{4}$ sr. Venetian red, 1 sr. vermilion. Macerate these ingredients together very finely. A good vermilion will result.

Take 1 sr. prepared lead powder, 1 sr. soapstone powder, 1 sr. hingul powder, 1 sr. red lead powder, 1 sr. vermilion No. (9). Macerate the ingredients together thoroughly and store away for 24 hours in a cool place. Finally, pound the produce finely and use.

(15)

Take $\frac{1}{4}$ sr. prepared lead powder, 2 srs. red lead, 1 sr. orange red powder, $\frac{1}{2}$ sr. soapstone powder, 1 sr. vermilion No. (9). Mix ingredients together and grind thoroughly.

(16)

Take $\frac{1}{2}$ sr. prepared lead powder, $\frac{1}{4}$ sr. chrome yellow, 2 srs. of vermilion No. (1) $\frac{1}{4}$ sr. red lead, $\frac{1}{2}$ sr. Indian red powder. Mix these ingredients together and grind to fine powder.

(17)

Take $1\frac{1}{2}$ srs. of *rasamaniḥ* and grind finely in a stone mortar. Then add the juice of aloes to form a paste by maceration. Dry in the sun on a porcelain dish and finally powder the cake finely. This is genuine vermilion

(18)

Take $1\frac{1}{2}$ srs. *rasamaniḥ* and 1 sr. *hingul* in a stone mortar and grind together to form a paste. Now add juice of aloes and macerate for half an hour. When the mixture is effected, place the mass on a porcelain dish out in the sun. To the dry cake thus obtained add an equal part of "prepared zinc powder" and grind together into fine powder. Now add an equal measure of red lead and incorporate thoroughly.

(19)

Take $2\frac{1}{2}$ srs. of prepared zinc powder, $2\frac{1}{2}$ srs. prepared lead powder, 5 srs. each of *hingul* and vermilion dye in fine powder. Grind these ingredients together in a mortar. The product will be good vermilion.

(20)

Take 1 sr. of prepared lead powder and 2 srs. of Indian red powder and grind them together. Now add $1\frac{1}{2}$ srs. of vermilion No. (17) and incorporate thoroughly.

(21)

Take 2 srs. orange red powder, 1 sr. prepared zinc powder, 2 srs. red lead, 1 sr. soapstone powder and 1 sr. *rasasindur*. Grind these ingredients together into fine powder.

(22)

Take 1 sr. vermilion dye, 2 srs. of vermilion No. (3), $\frac{1}{4}$ sr. prepared lead powder, $\frac{1}{4}$ sr. each of *rasamaniḥ* and *rasasindur*. Mix the ingredients thoroughly and grind into fine powder.

(23)

Take $\frac{1}{4}$ sr. of prepared zinc powder, 1 sr. vermilion No. (8), 1 sr. vermilion dye and $\frac{1}{2}$ sr. vermilion No. (17). Grind these ingredients into fine powder.

(24)

Take vermilion dye, *hingul* powder, *rasasindur*, orange red powder, chrome yellow powder, red lead, vermilion No. (3), vermilion No. (8) in equal parts, say 4 oz. each. Grind the ingredients together into a fine powder.

(25)

Take $\frac{1}{4}$ sr. pure mercury, and $\frac{1}{4}$ sr. pure sulphur, and macerate the two in an iron mortar. When the mass will turn

black transfer to an iron pan and apply gentle heat. Take away from fire when the mass becomes red and transfer to another porcelain vessel. After 24 hours mix $\frac{1}{2}$ poa *hingul* powder into it. The product will be pure vermilion.

The vermilion dye referred to as an ingredient in some of the recipes is a dry colour obtainable in the market. One seer is equivalent to two pounds.

GLOSSARY.

Aswatha—*figus religiosa*. The sacred peepul tree.

Gora Lebu—a variety of sour lime.

Ghrītakumari—a kind of aloe.

Hingul—is a sulphide of mercury (cinnabar) prepared by Ayurvedic physicians.

Neem—the margosa tree.

Rasa sindur, *Rasa maniḥ*—These are particular preparations of mercury and sulphur sold by herb dealers as bazaar medicines.

Trifala—the three myrobalans (Beleric, Chebulic and Embellic).

Jeera—cumin seed.

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Fresh fruit stains can be removed from linen if they are washed at once in cold water without soap. Wash every few hours until the stains are gone.

To improve worn oilcloth add a tablespoonful of painter's size to the water when washing. This will give the surface a fine gloss.

Candle ends, melted, strained and added to a little turpentine, make a good floor polish.

OUR DISTRICT POSSIBILITIES.

TRADE WITH NEPAL.

NEPAL is a large independent Indian State occupying the Southern ranges of the Himalayas beyond the Northern boundary of India. The area of Nepal is roughly 54500 sqr. miles and the population about 55 lacs, most of whom are Hindus. The dominant races are the Gorkhas and the Newars, the former being the ruling race and the latter may be called subject race.

The country is very interesting. Its physical features are imposing and grand because it is wholly mountainous and contains the highest peaks known in the world. The Northern portion is perpetually covered with snow. But the valleys are very picturesque for they lie like snakes low down between very high mountains and are covered with various kinds of beautiful flowers, fruits, etc. The snow-fed mountain torrents winding their ways crookedly round high mountains present a very fascinating aspect. Then there is the Terai covered with very dense forests and over-grown with all kinds of trees. Besides it is the home of all kinds of wild beasts such as tiger, leopard, wild elephant, bison, rhinoceros, etc. It is therefore very often resorted to by great personages fond of hunting.

To us Indians and specially the Hindus, Nepal has a very particular charm and no Hindu can utter the name of Nepal without legitimate pride because it is the only independent Hindu state in the world. It has ever remained Hindu. It is in Nepal again that the great shrine of *Pashupati* is situated where thousands

and thousands of Hindus go every year on the occasion of *Shivaratri*.

But Nepal has a great attraction for the business man also. A great deal of trade is carried on annually between the two countries. There seems to be a wrong impression in the minds of some that the Nepal Government does not encourage trade but puts obstacles in the way of Indian merchants. This is absolutely false. The administration is very sympathetic and all sorts of facilities are given to Indian merchants, desirous of trading in Nepal. Of course people desirous of pursuing trade that is detrimental to the interest and well-being of the people can not be carried on here. For example foreign liquors, etc., can not be taken in Nepal.

There are innumerable mines of copper, iron, lead, sulphur, mica, arsenic, *sora*, etc., and other valuable minerals, which have not been worked out. There is ample scope for prospecting and no man can be disappointed in this sort of work. The Government is sympathetic and any one interested in this sort of work may communicate with the Government. Copper and iron are taken out of such mines and are made into utensils and agricultural implements, etc, by the native of the country. But any extensive trade with foreign countries is not carried on in this line.

Building stone and specially roofing stone (much like slates) is also plentiful. There are very few buildings built of bricks. The houses too are generally covered with slates and not with tiles or grass.

The Nepal timber is already well-known throughout India. Some of the valleys produce bamboos of enormous size. Up-till very recently a larger number of Indian people were engaged in this trade. But the Government has changed its policy. The forests are now generally cut at Government cost and under Government supervision. So only the ready made timber may be bought at Government depots. This policy was much needed for the Government suffered a great deal of loss at the hands of petty unscrupulous contractors.

There are some very productive valleys also which grow plentiful crops of sugar cane, tobacco, rice, millet and other grains, etc. Nepal is specially well-known for its oranges and plantains, for these grow very abundantly.

The chief exports of Nepal at present are timber, Tibetan and Nepal ponies, shawls, wool and borax, cardamoms, ginger, ghee, leather, etc.

Intending business men can make a very decent profit in all of these but specially in ghee, wool and ponies. These are very cheap and may be bought in very large quantities also. Ready made blankets, etc., are also exported but they are very coarse and rough.

The imports of Nepal are numerous but the chief among them are sugar, tea, manufactured goods, such as strong, durable, cheap, cloth, brass utensils, etc. The poorer people generally use aluminium goods and *hora* cloth.

As the country is very mountainous and as there are innumerable torrents which swell to enormous size during the rains, communications are interrupt-

ed during the rainy season. The Hill people also are very much afraid of heat and so they do not come to the plains or the Terai in summer. The trade therefore is confined to winter and spring months only. To facilitate trade the Nepal Government has opened trade centres on the frontiers where Nepal goods are exchanged for Indian goods. A regular Bazar is held at these centres for about four months beginning with November of each year and a very extensive trade is carried on. Those who want to purchase any of the Nepal goods or to sell Indian products come to one of these centres. Shops may either be hired here or may be constructed.

Nepal has a coinage of its own but the Indian coinage is also accepted. One hundred rupees of the Indian coinage are roughly equal to one hundred and twenty five rupees of the Nepal coinage. The Indian rupee is called *Company Rupee* while the Nepal Rupee is called *Mahar Rupee*. Though the language is Nepali yet Hindi is understood by all.

The following are the various trade centres in Nepal:—

BRAMHADEO.—This is a moderately big Bazar. The nearest station is Tanakpur on the Rohilkhand and Kumaon Railway. Ghee, ginger, cardamom and wool are brought by the people from the interior. Of the Indian goods cotton cloth mainly *hora* and *gambroon*, brass and aluminium utensils, sugar, tobacco, umbrellas, etc., are in great demand. Sometimes horses are also brought for sale.

BUTTOL.—This is also a very big Bazar. The nearest Railway station is Bridgemongunj on the Gonda Gorakhpur

section of the B. & N. W. Railway. The main exports are ghee, paddy, cardmoms, ginger, horses, etc., and the imports are the same as in Bramhadeo.

NEPALGUNJ.—This is one of the biggest trade centres and though the chief articles of trade are the same as in Bramhadeo and Buttol yet the trade is much bigger here. The nearest Railway station is Nepalgunj Road on a branch line of the B. N. W. Ry. from Gonda.

RANTHAR.—This is also a fairly large Bazar like Buttol. The nearest Railway station is Bairagnia on the Darbhanga Narkatiagunj sec. of the B. & N. W. Ry. The chief articles of trade are the same as in Nepalgunj but spices are brought in much larger quantity.

TRIVENI.—The nearest Railway station is Sisawa Bazar on the Gorakhpur Narkatiagunj section of the B. & N. W. Ry. This Bazar is specially noted for the large trade that is annually carried in horses in addition to other articles as in Bramhadeo.

RAJAPUR.—This is another Bazar, the nearest Railway station being Katarnian Ghat on the B. & N. W. Ry. This is a smaller market and is suitable for men of smaller means.

KAILALI KANCHANPUR.—The nearest Railway station is Ramnagar on the R. & K. Ry. The chief articles of trade are the same.

BHIKNA THORI.—The Railway station of the same name on the B. & N. W. Railway.

MOHTARI.—The nearest Railway station is Janakpur Road on the B. & N.

W. Ry. The chief articles of trade are the same.

SARLAI.—The chief articles of trade are the same as in other Bazars. The nearest Railway station is Dhang on the B. & N. W. Railway.

All the above Bazars are very near to Railway stations and accomodation is easily available. The goods are generally carried from the Railway station to the Bazars on the backs of coolies of whom there are enough

KATMANDU.—The capital, commonly known as Nepal is a very decent city about sixty miles from Raksaul, a station on the B. & N. W. Railway. Very near to to Raksaul there is a place called Birgunj within the Nepal territory where every one has to take a written permit to go to the capital city. On securing the required permit the tourist can proceed further. His luggage will then be examined at Sisa garhi (*Chisapani garhi*) which is also the gate of Nepal. There is ample scope for business of all sorts specially in manufactured goods. Men of artisan class will find Nepal (*Katmandu*) very suitable for them.

As there is a very large nobility there, merchants and manufacturers can expect very good arrangement there.

The road to Katmandu is very good and all sorts of conveyances are available at Birgunj and Raxaul. There are also many *Dharamshalas* and rest houses in the city. The population of Katmandu proper is about two lacs.

There is a British Resident and British Post Office in Katmandu.

—By Mr. Ambika Prasad Pandey.

Small Trades & Recipes.

Rubber Solution.

The rubber solution obtained by the following recipe is good for cementing rubber tubes on cycles, etc.

Shellac	1 oz.
Guttapercha	1 oz.
Sulphur	45 gr
Red Lead	45 gr.

Melt together the shellac and guttapercha, then add, with constant stirring, the sulphur and red lead.

Cleansing Feathers.

The following recipe has been recommended for cleansing feathers of their animal oil. Take for every gallon of clean water one pound of quicklime, mix them well together, and when the undissolved lime is precipitated in fine powder, pour off the clean lime water for use. Put the feathers to be cleaned in another tub, and add to them a quantity of the clean lime water, sufficient to cover them about three inches when well immersed and stirred about therein. The feathers, when thoroughly moistened, will sink, and should remain in the lime water three or four days, after which the foul liquor should be separated from them, by laying them in a sieve. The feathers should be afterwards well washed in clean water, and dried upon nets. The feathers must be from time to time shaken on the nets, and as they get dry, they will fall through the meshes, and must be collected for use. The admission of air will be serviceable in drying. The process will

be completed in three weeks. When thus prepared, the feathers need only be beaten to get rid of the dust.

Ink for Tinware.

An ink for marking tinware is made by working up asphalt or black varnish with turpentine. It must be kept in a corked or stoppered bottle, and is shaken thoroughly just before use. On withdrawing the cork, enough of the marking fluid adheres to it, and the pen can be filled from the cork. The ink is removed rubbing with a cloth dipped in coal-tar oil or turpentine. Another suitable ink is made by reducing shellac varnish with alcohol, and adding finest lamp black. This forms a dead black ink insoluble in water, though it can be removed with alcohol.

To Transfer Prints to Glass.

Take of gum sandarac, 4 oz., mastic, 1 oz., Venice turpentine 1 oz., and alcohol, 15 oz. Digest in a bottle, frequently shaking and it is ready for use. Directions: Use, if possible, good plate glass of the size of the picture to be transferred, go over it with the above varnish, beginning at one side, press down the picture firmly and evenly as you proceed, so that no air can possibly lodge between; put aside, and let it dry perfectly, then moisten the paper cautiously with water, and remove it piece-meal by rubbing carefully with the fingers. If managed nicely a complete transfer of the picture to the glass will be effected.

INDIA'S INDUSTRIAL PROGRESS.

Home Industries of Bengal.

Strenuous efforts are being made by Murshidabad workers in bell-metal to produce specimens of their art equal in quality to the work of their fore-runners in the art in India. To make a wider appeal, they are manufacturing ash trays, salvers, cigarette boxes, finger bowls and trays.

The Utterpara potteries, likewise, make a concession to the modern spirit of the times and are placing on the market teapots, milk jugs and articles in daily use in European households. The Utterpara articles are by no means disappointing as far as finish and serviceableness are concerned.

The hand-made twill from Bankura is in many respects superior to the machine made article. It is sold at a slightly higher price than the ordinary twill, but it looks more durable.

To show these industries are progressing, the manufacture of sandals in Bengal has practically ousted Japanese sandals from the market. The leather-goods industry has made such strides that, unless superior workmanship and finish are desired, people are buying locally-made leather trunks and attache cases in preference to British-made goods. Cutlery manufactured in Calcutta is growing in popularity. Pen-knives made locally, which are sold at about half the price of imported ones are in great demand. Silk

socks made in Bengal, and equal in quality to the Japanese silk socks, are on sale at about half the price of the Japanese. Men's underwear, silk mufflers, towels and cotton socks, manufactured locally, find a ready market.

Textile Industry of Trichinopoly.

It is learnt from an official report for 1923-24 that the textile industry was under the supervision of Mr. N. K. Padmanabha Pillai, the textile expert. During the course of the year the main efforts of the textile expert were directed towards the improvement of handloom weaving which is one of the most important cottage industries of the State. Besides training people in weaving, knitting and dyeing itinerant parties were engaged in propaganda work so as to enable the cottage weavers to proceed to Trivandrum and undergo training to learn improved methods in weaving dyeing, etc. The Central Technological Institute is under construction pending the completion of which the textile section is now housed in a rented building where demonstrations in weaving, dyeing and knitting are being carried out. As a result of the propaganda work carried on by itinerant weavers the number of weaving institutions have increased considerably and so the Department has opened several depots where weaving accessories are sold to the cottage weavers at their very doors.

SCIENTIFIC AND TECHNICAL TOPICS.

By Air to anywhere.

Six years ago the first regular aerial passenger service was inaugurated between London and Paris.

To-day all the capitals of Europe are linked by air with London, and every month the fleet of Imperial Airways, Limited, fly on an average 135,000 miles—more than the equivalent of five times round the world.

Nor is this all. There is shortly to be inaugurated an aerial mail service between Port Said and India, and eventually this will be extended by way of Rangoon and Singapore to Port Darwin, thereby bringing Australia within about 100 hours of London, compared with the thirty days now taken by the fastest mail steamers.

Usefulness of Honey-bee.

Honey has a special food value for children and those who have delicate digestions; it has a particular use, as sweetening for cakes and other foods and the preparation of confections and sweets, while it forms a welcome change from the usual jams and syrups as a table sweet.

The importance of the honey-bee in connection with the pollination of flowers and the assurance of fruitfulness of many species of plants is another point not always recognised. In temperate countries the abundance of orchard and other fruits has been found to be greatly influenced by the activity of the honey-bees at the critical time.

Poisons Manufactured in our Bodies.

Every day of our lives our bodies are manufacturing poisons.

When we breathe in the oxygen of the air, it combines with the carbon we have taken in with our food, and is breathed out as carbonic acid. And carbonic acid is a poison.

It is in the work of digestion, however, that the greatest amount of poison is formed. But there is in the body an organ specially charged with the function of destroying these poisonous products. This is the liver.

These poisons naturally circulate in the blood, and as the blood stream passes through the liver, the poisons as well as the germs which have been taken into the body, are destroyed.

Another agent for removing poisons consists of tiny tubes, running through the body and connecting at certain places with glands which take up the harmful poisons.

The best known of these glands are in the neck and armpits. Sometimes they get so charged with poison that they become inflamed and even have to be operated on or cut out.

Uric acid—the best-known product of digestion—is also a poison.

In combination with certain other materials, forming urates, uric acid makes salts which are deposited in the tissues especially where the circulation of the blood is very slow, as in the big toe. The result is that a pain is produced which is so characteristic a symptom of gout.

FORMULAS, PROCESSES & ANSWERS.

Mineral Lubricating Oils.

1923. G. D. S. C, Ahmedabad.—Wants a recipe of mineral lubricating oil.

These oils are prepared by boiling together milk of lime, some vegetable oil and a mineral oil until a homogeneous salve-like mass is obtained. A lime soap is formed, which dissolves in the oils, and the larger the quantity of this soap the higher the melting point and the viscosity of the mass when melted; these greases are specially suitable for high pressure steam engines. The accompanying recipe is a good one.

Mineral oil	100 parts.
Linseed oil	30 parts.
Ozokerite oil	20 parts.
Lime	9 parts.

Frosting Glass.

1762. M. R, Hyderabad.—Wishes to be enlightened on frosting glass.

Clean the glass panes thoroughly and moisten with hydrofluoric acid. When frosted enough, wash thoroughly.

Etching Glass Pots.

1605. D. S, Benares.—Enquires how to etch glass pots.

Sodium fluoride	1 oz.
Glacial Acetic Acid	10 dr.
Water	25 oz.

Dissolve the sodium fluoride in water and add the acetic acid. The

article to be etched is first coated with etching varnish, which is scratched off where a pattern is desired, and then immersed in the solution. The fluid may be applied with a rubber stamp.

Slate Pencils.

1700. M. N, Kamptee.—Asks how slate pencils are made.

Slate pencils can be made in the following way. Take slate powder 6 parts, lime stone dust 3 parts and sodium silicate, 1 part. Knead the mixture into a plastic mass and force through a perforated plate so that each pencil is deposited on a grooved slate. The ends are cut off with a sharp saw. One end being tapered on a grindstone they are put up by hundreds for sale.

Removing Tattoo Marks.

1696. S. A. H. T, Jaunpur.—Requires a process of removing tattoo marks.

Apply nitric acid with a pointed glass rod just sufficient to cover the stain, so as to avoid making a large scar than needful. Let the acid remain about one minute and a half until a crushed appearance shows itself. Then wash off with clean cold water. A scale will form in a few days after this treatment. This contains the tattoo mark. Remove it. If however, there be inflammation poultice and bathe with warm water.

Removing Oil and Grease Stains from Paper.

1910. S. F. Moulmein.—Writes how to remove oil and grease stains from paper.

Oil can be removed from paper by soaking the latter in benzoline (petroleum ether) for a few hours, then draining and soaking in a fresh lot of benzoline for half an hour; now remove the paper and allow it to stay in an open place till dry.

Grease stains may be removed from paper by thoroughly moistening the stained parts of the paper with benzine or petroleum spirit; on this kept a piece of clean blotting paper and over this run a warm iron. Repeat treatment if necessary.

Egg Preserving.

1914. A. P. Andheri.—Desires to be enlightened on preserving eggs.

If the eggs are only to be kept for a month, boxes having $\frac{3}{8}$ -in centre-bit holes bored through a false bottom, which is kept about $\frac{1}{2}$ in. above the ordinary bottom of the box by means of $\frac{1}{2}$ in. strips nailed round the edges, may be used. The eggs are inserted, small ends downwards, in the holes, these being placed so that the eggs do not touch each other. This is the best method of keeping setting eggs. If the eggs are to be kept longer lime water may be used. Add, 1 pt. of unslaked lime to 1 gal of water, boil, and when cold allow to settle; then pour off the clear water into stoneware jars. Gather the eggs as they are laid, and put them whilst perfectly fresh into the jars.

When full, cover up the jars air tight and place in a cool position. Water glass is now generally used instead of the lime. This can be purchased in tins holding about 1 pt. and this amount is added to 6 qt. of hot water that has been boiled and well stirred up. The liquid is then put in stoneware jars as described for the lime water, and the eggs placed in and put away until required, when they are removed from the solution, washed in cold water, and wiped dry with a cloth. The jars should be kept in a cool place. Table salt is sometimes used instead of the liquid. The eggs are placed in jars and packed in with salt, which takes the place of the liquid preservatives mentioned above. Eggs are sometimes preserved by packing in boxes of finely-ground dried peat, and another method is to cover each egg with a thin coating of grease to fill up the pores of the shell. Generally speaking eggs should be kept in a cool place.

Artificial Yeast.

1331. H. N. S. Bhalwal.—Wants to manufacture artificial yeast.

Mix 2 parts by weight of fine flour of pale barley malt with part of wheat flour; stir 50 lbs. of this mixture gradually into 100 quarts of cold water, with a wooden spatula, till it forms a smooth pap. Put this pap into a copper over a slow fire. Stir it well till the temperature rises to fully 155 degree to 160 degr. Fahr. when a partial formation of sugar will take place, but this sweetening must not be pushed too far; turn out the thinned paste into a flat cooler, and stir it from time to time. As soon as the

wort has fallen to 59 degr. Fahr. transfer it to a tub, and add for every 50 quarts of it 1 quart of good fresh beer yeast, which will throw the wort into fresh fermentation in the course of 12 hours. This preparation will be good yeast fit for bakers and brewers uses, and will continue fresh and active for three days. It should be occasionally stirred.

Turkey Red Oil.

1748. G. B. D, Jalpaiguri.—Requests us to throw some hints on the preparation of Turkey Red Oil.

Castor Oil is treated by 20 per cent. of sulphuric acid of 66 degree Be. by allowing the acid to flow slowly into the oil in a thin stream whilst stirring. The oil is contained in a lead-lined iron vessel, cooled by ice. After standing 2 to 3 hours the mass is gradually diluted under steady stirring by luke-warm soda solution, 28 kilos. of crystallized soda being used to 1 kilo of acid. After standing overnight the finished product separates.

Papier Mache.

A. S, Rampur State.—Writes, 'What is papier mache and how is it prepared'?

Papier Mache is the French term for a preparation of moistened paper, from which many articles of every day use are prepared. Two modes are adopted for making articles of this kind: (1) by glueing or pasting different thicknesses of a paper together; (2) by mixing the substance of the paper into a pulp and pressing it into moulds. The first

mode is adopted principally for those article such as trays, etc., in which a tolerably plain and flat surface is to be produced. Common mill board, such as forms the covers of books, may convey some idea of this sort of manufacture. Sheets of strong paper are glued together, and then so powerfully pressed that the different strata of paper become as one. Slight curvatures may be given to such paste board when damp by the use of presses and moulds. Papier Mache properly so called, however is that which is pressed into moulds in the state of a pulp. This pulp is either paper-maker's pulp, or is more generally made of cuttings of coarse paper boiled in water, and beaten in a mortar till they assume the consistence of a paste, which is boiled in a solution of gum arabic or of size, to give it tenacity. The moulds are carved in the usual way and the pulp poured into them, a counter-mould being employed to make the cast nothing more than a crust or shell, as in plaster casts.

Bar Soaps.

1848. J. S, Chapra.—Requests us to publish a good formula of bar soap.

The best type of English bar soaps are made from a mixture of tallow and rosin, containing some 15 to 25 per cent. rosin, and are good detergents, though not suitable for washing lace and delicate white fabrics, on account of the liability to stain, due to the presence of so much rosin. These soaps owe their colour and characteristic odour to the rosin they contain, though a small amount of artificial colouring matter is sometimes added.

A lower grade bar soap, containing 62 to 64 per cent. of fatty acids is made from tallow or bone fat, or unbleached palm oil, with pressed coconut oil, cotton seed oil, or cotton soap stock and a darker rosin; the unbleached palm oil imparting a brown colour to the soap. The proportion of rosin to be added depends upon the firmness of the other materials employed. If a low litre bone fat and much cotton seed oil are used, it will not be possible to add any considerable quantity of rosin without injuring the body of the resulting soap, in the case of genuine soap, though this defect can be rectified by crutching in sodium carbonate or silicate. It is generally advisable to use firmer stock with less rosin. For a brown soap, a fairly dark coloured rosin may be used.

Cheaper bar soaps are made which are no longer pure soaps, i.e., in which the proportion of fatty acids falls to 50 per cent. and even less. These are prepared by 'liquoring' or 'running' soaps similar to those described above, but more coarsely fitted, by admixing in the crutching pan solutions of sodium carbonate, silicate chloride or sulphate. The two former have distinct detergent qualities, and their addition to soap is often justified on this ground, but they very much reduce the cost of a soap owing to their hardening property, which permits of the use of a large proportion of oil or rosin in the stock or of a greatly increased percentage of water in the finished soap.

Scents.

1695. A. K. M. Baroda.—Wants recipes for scents.

(1) Jasmine.

Linolo oil	$\frac{1}{2}$ dr.
Bergamot oil	$\frac{1}{4}$ dr.
Jasmine oil	$\frac{1}{4}$ dr.
Jasmine	7 $\frac{1}{2}$ oz.
Alcohol	8 oz.

(2) Rose.

Lemon grass oil	$\frac{1}{4}$ dr.
Neroli oil	$\frac{1}{4}$ dr.
Jasmine	1 oz. 15 $\frac{1}{2}$ dr.
Cassie	2 oz.
Orange flower	3 oz.
Rose	9 oz.

Black Enamel for Cycle.

1771. M. A. R, Jodhpur.—Writes, 'How black enamel for cycles is prepared?'

The basis for cycle enamels may be made from either of the following recipes.

(1)

Shellac	2 lb.
Methylated spirit	1 gal.
Linseed oil (raw)	4 oz.

(2)

Shellac	1 lb.
Resin	1 lb.
Manila copal	4 oz.
Raw linseed oil	4 oz.
Spirit	1 gal.

Mix together. Should this prove too thin, add a little more shellac. For preparing cycle black add to the above a little vegetable black and spirit black to colour it and 4 oz. boiled linseed oil to the gallon.

Ginger Liqueur Essence.

1818. N. N. Y, Nellikuppam.—Wants a recipe for ginger liqueur essence.

Wine distillate	1 $\frac{1}{2}$ oz.
Ginger essence	6 $\frac{1}{2}$ oz.
Alcohol	8 oz.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of **INDUSTRY** are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

1794. K. S. N., Madras.—In preparing vermicelli the different flours are mixed according to the quality of the product desired. Formulas for Phenyle, Khaki dyeing, Hair dyes (both varieties) etc., have appeared many times. Benzoin is a natural product. Fabrics may be printed with colour by the process known as "Calico printing." It will be advantageous for you to employ the services of an expert for the manufacture of printing inks. The formulas for the other articles will appear in a future issue.

1796. J. M. S., Murshidabad.—For particulars of Jamshedpur Technical Institute write to the Director of Public Instruction, Bihar and Orissa, Patna.

1797. V. M. B., Bombay.—Logwood is known as "bakkan" in Bengali and "partanga" in Kanarese; its Marathi equivalent is not known. You should not replace logwood by some other articles. For particulars write to the querist with number and initial under care of **Industry** when your letter will be duly redirected.

1798. M. E., Mandalay.—For flour mill write to Burn & Co., 7, Hastings Street, Calcutta who will supply you with all necessary details on the subject.

1799. G. H. M. J., Bassam.—Perfumery and Essential Oil Record is published from 8, Serle Street, Lincoln's Inn, London W. C. 2. Formulas of toilet soap will be found in April 1925 issue. For hair oil you may go through the booklet on Hair Oil Manufacture published from this office. Recipes of essences appeared in September 1924 issue. Required addresses are not known to us.

1800. S. T. B., Karachi.—For particulars regarding coir go through December 1924 issue of **Commercial India** which contains an article on coir. An article on Indian cotton

industry appeared in July 1924 issue where you will find particulars regarding cotton.

1801. L. A. S. S., Colombo.—It is not possible to polish the floor after cementing it. You may mix colour with cement. Cloth flags are printed by the process of calico printing. It will be advisable for you to engage an expert.

1802. G. D. M., Surat.—For tooth complaint consult a dentist. Formula of "surma" will appear in an early issue.

1803. R. M., Kayatar.—Rice husking machines may be supplied by Ghatak & Co., Rai Bahadur Road, Behala, Calcutta.

1804. J. F. C. B., Goa.—You may go through Poultry Keeping in India by Mr. Isa Tweed and Handbook on Indian Agriculture by Mr. N. G. Mukherjee.

1807. B. V., Cocanada.—For learning homoeopathy write to the Secretary, C. H. Medical College, 104, Cornwallis Street, Calcutta; you may read Match Industry by Mr. K. C. Sen to be had of Bhawani Engineering and Trading Co., 122/1, Upper Circular Road, Calcutta.

1809. V. S. K. S., Myingyan.—Envelope making machines may be bought of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

1811. S. B. Vizagapatam.—Jewellery tools may be supplied by Messrs. L. Basack & Co., 5, Old Court House Corner, Calcutta. For machines you may try T. E. Thomson & Co., 9, Esplanade East, Calcutta.

1812. A. B., Gulbarga.—You may clean the window panes with methylated spirit.

1814. S. T. B., Karachi.—Soda water-glass is not soda and water glass as given previously but simply sodium silicate. Sodium silicate of required specific gravity may be had of D.

Waldie & Co., 1, British Indian Street, Calcutta. Mix the potassium carbonate with sodium silicate. You need not use water.

1815. K. N. B., Agra.—Addresses of foreign trade journals will be found elsewhere in these columns.

1816. N. C., Iraq.—Hair dyes may be supplied by Bengal Stores, 7|1, Tagore Castle Street, Calcutta.

1817. B. V., Rajahmundry.—Aluminium ingots may be supplied by Bay View Foundry Co., Sandusky, Ohio; Dorchester Brass and Aluminium Foundry, Hyde Park, Massachusetts and Enterprise Foundry Co., Detroit, Michigan; all of U. S. A.

1891. D. K. D. B., Sirse.—Keep your pocket lamps in dry and well-ventilated place and take care that extremities may not come in contact with any metal.

1820. N. T. B., Timarni.—For Derby tickets write to the Secretary to the Royal Calcutta Turf Club, 13, Russel Street, Calcutta.

1821. K. G. S., Rajkot.—Enamelling on gold is done by Nag & Nephews, 25|1|1 Kanai Dhar Lane, Champatala, Calcutta. For books on enamelling may be brought of Chakraverty Chatterjee & Co. Ltd, 15, College Square, Calcutta.

1822. D. N., Nagpur.—Refer your query to the Director of Industries of your province.

1823. N. P. S., Pachamba.—Motor lorries may be supplied by French Motor Car Co. Ltd, 24|3|3, Lower Circular Road and Allen Berry & Co. Ltd., 62, Hazra Road, Ballygunge; both of Calcutta. Stationery goods may be supplied by Dass & Co., 60, Sikdar Bagan Street and Nilmony Haldar & Sons, 106, Radha Bazar Street; both of Calcutta. Can supply mica in large quantities.

**German Aniline Dyes, and Chemicals
of the well-known manufacturers
Messrs. Leopold Cassella & Co.,**

Largely consumed by big Industries, such as
Jute, Silk, Cotton, Wool, Leather,
Paper, Inks, etc.

—STOCKISTS:—

**Messrs. Fazlehusein & Brother,
44, Armenian Street, Calcutta.**

1826. R. D. J., Almora.—You may consult Thacker's Indian Directory. Vide No. 1534 in September issue.

1828. M. D. M., Rajouli.—For estimates of tube well write to Bengal Tube Well and Agricultural Works, 75|1, Barrackpur Tank Road, Cossipur; Texas Tube Well Co., 5, Dalhousie Square and Swedish Trading and Engineering Co., 13|3, Old Court House Street; all of Calcutta.

1829. B. M., Allahabad.—Articles on chewing and smoking tobacco preparation appeared in October and November 1924 issues of **Industry**. For books on sugar manufacture write to Chackraverty Chatterjee & Co. Ltd. 15, College Square, Calcutta.

1830. G. S. M., Udaipur.—For books on survey enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta. Survey is taught at Bihar Engineering School, Patna. No such medicine is known to us. For particular of advertiser write direct to the party.

1831. S. K., Sevalia.—The issue containing the article on bamboo whistle making is not available.

1832. S. R. R., Jaffna.—For sugar manufacture it is better for you to read some books on the subject which may be supplied by the Book Co., 4|4A, College Square, Calcutta.

1833. L. N. B., Dergaon.—It is very difficult on our part to say which of the Aligarh lock companies is the best. However the following are some of the lock manufacturing firms of Aligarh: (1) Chas Ashtan & Co., Grand Trunk Road; (2) Diamond Jubilee Lock Factory; (3) Electric Lock Works, Madar Gate and (4) Govilla Lock Works.

1934. T. K. P., Anamalai.—Sewing thread may be bought of Shah Daraza Sewing Cotton Co., Hyderabad, Sind. For the required machine try Oriental Machinery Supply Agency Ltd., 20|1, Lall Bazar Street, Calcutta.

1835. P. C., Sambalpur.—Wants to be put in touch with dealers in silk cocoons.

1836. P. P. S., Alleppey.—To correspond with any querist write him with number and initial under care of **Industry** when your letters will be duly redirected.

1837. L. R. C., Chittoor.—For brass die enquire of Victoria Brass Works, 44, Sankaripara Road, Bhawanipur, Calcutta

1838. N. V. P. S., Jogai—Vide No 1836

1839. S. A. C., Shamnaganathapuram—Nib making machines may be supplied by Bengal Small Industries Co., 91, Durga Charan Mitter St., Calcutta. Your other enquiry appears elsewhere in these columns

1840. D. C., Jullundur—For manufacturing soap you may go through Soap Manufacture by Mr A. Watt

1841. K. M. Y., Bhaktal—Wants to be put in touch with dealers in Madras imitation rubies

1842. A. S., Kandukur—Yes, there is still some prospect for hosiery trade. It will be advisable for you to buy Harrison type knitting machine which may be supplied by W. H. Brady & Co., 26, Strand Road, Calcutta. Machine supplier will give you all other necessary information

1843. B. L. C. S., Bangalore—For learning photography try to be an apprentice in a photographic firm. As regards developing solution you will have to learn that by practical training. About Rs. 500 will be required for starting a business

1844. M. L. H., Bundi—Oleo-stearin is a kind of vegetable butter used for tallow or lard. Ferrous sulphate is 'huakas'. Tai is 'alkatra'. Vernacular equivalent of other chemicals is not known

1845. T. D. A., Larkana—Recipes of snuff will be found in November 1924 issue

1846. M. A., Bombay—No powder substitute for hydrogen peroxide is known

1847. P. F., Nazira—Crane's feather may be bought of Moti Ram Jearather, Basti Guzan, Jullundur.

1852. R. G. D. B., Hyderabad—Recipe of lime juice and glycerine creams will be found in August 1921 issue. Process of preparing pain balm appeared in October 1921 issue. Recipes of lavender water appeared in September 1924 issue.

1853. A. D., Ellore.—Process of preparing ebonite appeared in February 1925 issue. Pro-

cess of fixing red lead and litharge to the accumulator plates will appear in an early issue.

1854. R. N., Bombay—Refer your query to the Principal, Serampore Weaving Institute, Serampore, Howrah or to the Director of Industries, Punjab, Lahore

1855. G. A., Pandharpur.—If you go through the Sale and Exchange pages of **Industry and Commercial India** you will find many addresses of firms desirous of opening agency

1856. T. S. R., Bangalore—Process of preparing bread and biscuit appeared in February 1925 issue. An article on Ink Manufacture appeared in November 1922 issue. Fountain pen ink in powder form will not be suitable for use

1857. K. N. D., Bamanal—Fountain pen barrels are made of gutta-percha. Melted rubber is not available in market. Desires to buy hand bellows

1859. D. D., Bannu—There is no book dealing with preparation of syrup for lemonade, ginger rose and other kind of mineral water. However you may write to Chackiaverty Chatterjee & Co. Ltd., 15, College Square and Thacker Spink & Co., 3, Esplanade East, both of Calcutta

1860. G. C. R., Cuttack—Commercial subjects are treated elaborately in the pages of **Commercial India**, the sister journal of **Industry**. Capital to be invested depends mainly upon the scope of the business. You may start timber trade with Rs. 2,000 as an initial capital. The following is a list of timber merchants of

BOMBAY DESHI OUSHADHALAYA.

Factory & Dispensary.

ASK FOR ANY FEVER

Ague Killer.

1 Phial as. 8

Doz. Rs. 5.

and our other popular remedies. Can be had everywhere at Cheapest Rate.

PEARL & CO., Victoria Garden,

BOMBAY.

Calcutta: Bengal Timber Trading Co, 4, Clive Row; Bird & Co, Chartered Bank Bldgs, Clive St.; Bombay Burma Trading Corporation Ltd., Shibpur, Howrah; Motilal Radha Kissen, 67, Strand Road, Nintola and P. C. Sarkar & Bros, 62, Strand Road, Nintola

1862 D. P. S., Nowabgunj.—An article on photography will appear in an early issue

1863 D. D., Delhi.—For broadening your chest you may try Sandow's chest developer or take to other physical exercise. For improving complexion you may try various kinds of beauty creams available in the market. Other queries are not in our line.

1864. M. S. M., Nyaunglebin.—For shirt and coat labels enquire of E. B. Bros & Co, 11, Dharamtola Street, Calcutta. For twills and fancy cloths write to Beharilall Lachmi Narain, 158, Cross Street and Chunilall Sewchand Roy, 152, Cross Street; both of Calcutta. The above firms may also supply linen cloths.

1865. R. M. G., Dacca.—There is no school for learning block making. You may write to Calcutta Fine Art Syndicate, 147, Baranosi Ghosh Street and Calcutta Halfstone Co, 69/A, Sukea St., both of Calcutta, whether they would take your ward as an apprentice.

1866. J. D. D., Seoni.—We are not aware of the particular glass cleaning solution referred to by you but you may try Klenzol manufactured by our advertisers The Andheri Industrials, Andheri, Bombay.

1867. S. G. R., Tuni.—For learning dyeing you may write to the Principal, Serampore Government Weaving Institute, Serampore, Howrah.

1868. P. S., Chicacole.—Fire works may be bought of Orient Fire Works, 85/1, Upper Circular Road and Bonbonniere Ltd., 32, Dalhousie Square; both of Calcutta.

SERVICEABLE GOODS.

High Class Ready Made Swadeshi Clothes.

Madras Tassar Coat Rs. 4/- and Rs. 3/-; Suit Rs. 7/8 and Rs. 5/4; Twill Shirts Rs. 1/8; Jaffer Shirts Rs. 1/6; Warm Frocks As. -12/- with order. We defy competition in Prices and Artistic Cutting.

MAHINDRAKAR BROS.,
Bombay No. 4 or 12 & Poona City.

1869. D. K. D. B., Sirsi.—Rolled gold articles may be bought of Mohamed Alibhoy Jeevabhoy & Co., Grant Road, Bombay. Hosiery goods may be supplied by E. B. Bros & Co, 11, Dharamtola Street and Sen, Abdul & Co, G 26, 27 & 28, Municipal Market; both of Calcutta. For piece-goods refer to No. 1864 above.

1870. M. S. T., Minhya.—You may try glue for sticking umbrella handles. Pure sandal oil may be bought of Mysore Trading Agency, College Street, Calcutta.

1871 A. R. T., Calcutta.—'Momechhal' is antimony sulphide. It is used in the mixtures employed for making the heads of lucifer matches, and also in the preparation of fire works. On passing sulphuretted hydrogen through a solution of antimonious chloride this sulphide is thrown down as an orange coloured precipitate. It is soluble in a solution of sulphides of the alkalis.

1872 V. N. C., Nehra.—It will be advisable for you to consult a local mistry or mechanic. Tools may be supplied by N. G. Mitter, Chandney Chowk, Calcutta.

1873. G. H. M. J., Bassein.—Recipe of depilatory soap appeared in April 1925 issue. Recipes of hair removing powder and solution appeared several times in **Industry**. Formula of laundry soap appeared in July 1925 issue. You may consult Henley's Twentieth Century Book of Recipes, Formulas and Processes to be had of Chackraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta. For secondhand books enquire of S. C. Auddy & Co., 85, Wellington Street, Calcutta. For secondhand directory go through Sale and Exchange pages of **Industry**.

1874. K. A. R. R., Bodasakurru.—Formula of pain balm appeared in October 1921 issue. Patent medicines may be supplied by Martin & Harris, 8, Waterloo Street, Calcutta. For exporting goods you may correspond with Kelavkar & Tyrell, 54, Meadows Street, Fort Bombay and Alliance Trading Co., 4, Hare St., Calcutta. For ringworm ointment consult a physician.

1881. N. C. K., Elikoppaka.—Fancy goods may be had of Laurel Novelty, 43, Park Street, Calcutta. Toys may be supplied by K. B. Nan, 233, Old China Bazar Street, Calcutta

1882. S. B., Poona City.—Opium, hemp, etc., are vegetable intoxicants, which in proper doses, are nonpoisonous. The seeds of 'Dature' possess strong intoxicating properties.

1883. G. P. P., Pandu Memas.—For tube well write to City Tube Well Co, Kuver Ltd, 85, Clive Street; Swedish Trading & Engineering Co., 13/3, Old Court House Street and Texas Tube Well Co, Dalhousie Square; all of Calcutta.

1884. D. D. H., Simla.—There is no such institution known. You may however write to Calcutta Dental College and Hospital, Bowbazar Street, Calcutta. You may wash silk cloths with Indian soap nut (rita). Watery sulphuric acid is an excellent agent for destroying bed bugs. It is sufficient to sprinkle a few drops of acid upon the places or into the joints and holes infested by the insects.

1886. M. V. M., Ahmedabad.—For Leipzig Fair Directory write to Consul-General for Germany, 2 Store Road, Ballygunj, Calcutta.

1888. C. M., Phulera.—The Indian Trading Co, Jaipur and Sri Ram Kamath & Co., 1, McLean Street, George Town, Madras deal in feather.

1889. J. M. G. S., Ahmedabad.—Kali chunam is employed in white washing. It is seldom exported from India.

1891. M. B., Meerut.—The address of G. T. Racek & Co., is Loharchal Street, Bombay, and 111, Radha Bazar Street, Calcutta.

1893. M. S. M., Tuticorin.—Envelope and twine making machines may be supplied by Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta

1894. M. A. N., Quetta.—Brazil wood may be bought of S. N. De, Post Box 7851, Calcutta

1895. T. P. D., Triplicane.—Wants to know the address of exporters of homeopathic, biochemic and electro-homeopathic medicines of America.

1896. S. V., Narasapur.—Wants to be put in touch with dealers in Pleaff sewing machine.

1897. K. M., Srinagar.—For waste films enquire of J. F. Madan & Co. Ltd., 5, Dharamtola Street, Calcutta.

1898. T. M. C., Multan City.—Artificial silk is manufactured by La Soie de Chatillon, V. Venezia 61, Milan, Italy.

1899. No Name.—For industrial books write to Chackraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta. For the present prospect of industries and export and import trade of Bengal and Bihar & Orissa you may go through **Industry** and **Commercial India** regularly.

1901. B. C. V., S. Benan.—Tin cans may be had of Rampratap Gajanand, 6, Halsi Bagan Road, Calcutta.

1902. P. L., Ballipadu.—Your queries being in the nature of an advertisement should not be published in these columns.

1903. M. S. R., Narsapur.—Wants to be introduced to dealers in celluloid sheets.

1905. L. M. G., Sholapur.—Books on bakery may be bought of Thacker Spink & Co., 3, Esplanade East, Calcutta.

1906. P. M., Allahabad.—Scents and essences may be supplied by Burgoyne Burbidge & Co. Ltd., High Street, East Ham, London E. C. and Heine & Co., A. G., Leipzig, Germany. For printing and block making write to M. Heyde, Querstrasse, 15-17 Leipzig and C. L. Keller, Brandenburgstrasse 43, Berlin; both of Germany. Oriental Machinery Supply Agency, 20/1, Lall Bazar Street, Calcutta may import tin can and box making machine on your behalf. Communicate with the party for terms, etc.

1907. D. N., Nagpur.—Refer your queries to the Director of Industries of your province.

1908. K. P. B., Lucknow.—Chemicals used in fire works may be bought of B. K. Paul &

LIMITATION OF FAMILY.

Third Ed. 5 Portraits, 55, Engravings.
357 Pages, Price Rs. 3, Postage Extra.

A comprehensive and Confidential Treatise. Every parent desiring to regulate the number of children according to his health and means will find it a God-send. Ask for table of detailed contents which will be sent free.

K. M. DAS & CO.,
25-1, Telepara, Sampooker St., Calcutta.

Co., 1-3, Bonfields Lane, Calcutta You may use gun powder prepared according to the following recipe Nine parts potassium chlorate, $\frac{1}{2}$ of sulphur and $\frac{1}{2}$ of wood charcoal You perhaps mean pyrogallic acid

1909 G D A, Allahabad—Picture post cards may be supplied by B M Malabari 3, Nilmadhab Sen Lane and Majumdar Agency, 64, Machua Bazar Street; both of Calcutta For the required rubber instrument enquire of B K Paul & Co, 1-3, Bonfields Lane, Calcutta

1911 H A M, Bareilly—Match making machines may be bought of Bhawani Engineering & Trading Co, 122/1, Upper Circular Road and Bengal Small Industries Co, 91, Durga Charan Mitter Street, both of Calcutta

1912 S S R, Kistna—Match splints and veneers may be supplied by Sunderban Match Works Ltd, 12, Dalhousie Sq, and Bonde Mataram Match Factory, Tallygunge, both of Calcutta Match chemicals may be supplied by Oriental Industrials Co, 9, Bonfields Lane, Calcutta For papers write to Ghose Bros, 63 J, Radha Bazar Street, Calcutta Recipes of match compounds will be found in September 1923 issue

1916 G G A, Goa—For imitation pearl enquire of Laurel Novelty Co, 43, Park St, Calcutta.

1917 M. C S, Sitapur—Wants to know the address of the agent of Thomas Bear & Co, in India.

1919 H R, Rewari—You may use coal tar.

1920. C R D, Bhavnagar—Dissolve two ounces of borax in three pints of boiling water, and before it is cold add one teaspoonful of the spirits of camphor and bottle for use A tablespoonful of this mixture, with an equal quantity of tepid water and applied daily with

soft brush, preserves and beautifies the teeth, extirpates all tartarous adhesion. When any article has had tea spilled over it be careful not to allow soap to touch it till the stains are removed for the alkali in the soap will make the colouring matter into fast dyes. Spread the stained part over a basin and pour clean, soft, boiling water through it If the stains prove obstinate, rub it in a little powdered borax and pour on more boiling water; then place the article to soak For the growth of hair you may use either castor oil or coconut oil

1921 M M B, Bombay—Formula of Turkey red oil appeared in November 1924 issue Process of manufacturing Glauber's salt appeared in July 1925 issue

1922 P V, Kothapeta—Recipes of snuff and zarda will be found in November 1924 issue

1925 G P A, Almora—An article on rose water manufacture appeared in April 1925 issue

1926 M H B, Gujrat—Wants to purchase 'rush' used on the seats of chair

1928 C B G, Samalkha—Chemicals you require may be bought of B K Paul & Co., 1/3, Bonfields Lane, Calcutta

1929 P S S, Tichy—You may take to some industries that require knowledge of chemistry, viz, acid manufacture, paints and varnish manufacture You may also undertake chemical analysis.

1931 S K A, Ambala City—Recipe of luminous paint will be found in May 1924 issue. Kerosine oil may be made odourless by shaking it first with 200 grains of chlorinated lime for over 9 litres, adding a little hydrochloric acid, then transferring the liquid to a vessel containing lime, and again shaking until the chlorine is removed. After allowing the materials to subside the clear kerosine oil is decanted and stored away

1935. R S K, Rampore—You may correspond with the following service securing agencies: Service Procuring Agency, London House, Lansdowne Road, Apollo Bunder, Bombay and Peern & Co, 9, Nazir Lane, Kidderpore, Calcutta.

SETT DEY & Co

ORIGINAL HOMEOPATHIC PHARMACISTS,
42, Strand Road, Calcutta.

Dealers in Original Homoeopathic dilutions
and Biochemic Triturations.
Catalogue Free on Application

1936. D. R. L., Raikot.—Thank you for your suggestion.

1937. S. B. G., Bhadreswar.—To prevent mould you may add a little quantity of rectified spirit. Tin boxes may be bought of Rampratap Gajanand, 6, Halsi Bagan Road, Calcutta. Printing press and types may be bought of Ashutosh Addy & Co, 16, Lower Chitpur Road, and Eastern Type Foundry, 20, Brindaban Bysack Street; both of Calcutta. Your other two enquiries being in the nature of an advertisement should not be published in these columns.

1939. J. C. N., Sibsagar.—Balance and stone mortar and pestle may be supplied by B. K. Paul & Co, 1-3, Bonfields Lane, Calcutta. Gum arabic may be bought of Bansidhar Dutt & Sons., 126, Khengraputty, Calcutta. Glass cutting instrument may be supplied by Fotic Lal Seal, Swallow Lane, Calcutta. Yes, you may buy three bottles of methylated spirit at a time. Add the first solution when the other is on the fire.

1940. M. R. D., Gujranwala.—Process of manufacturing caustic soda will be found in May 1924 issue.

1941. S. M. H., Dehra Dun.—Recipes of natural and artificial ottos will be found in September 1924 issue.

1942. S. J., Masulipatam.—Mortar and pestles may be bought of B. K. Paul & Co, 1-3, Bonfields Lane, Calcutta.

1944. N. R., Amballa.—For dry ginger enquire of Bansidhar Dutt, 126, Khengraputty, Barabazar, Calcutta.

1945. C. M. B., Mahikantha.—For tube well write to Texas Tube Well Co, 5, Dalhousie Square and Bengal Well & Agricultural Works, 75/1, Barrackpur Trunk Road, Cossipur; both of Calcutta.

1946. H. R. V., Bangalore City.—Toys are imported by K. B. Nan, 233, Old China Bazar Street, Calcutta. Porcelain toys are manufactured by Calcutta Pottery Works Ltd, 45, Tangra Road, Calcutta. Seeds may be bought of Sutton & Sons., Park Street and Nurjehan Nursery 2, Kankoorgachi 1st Lane; both of Calcutta.

1947. B. S. Khaur.—Mechanical books may be bought of Thacker Spink & Co, 3, Esplanade East and Chakraverty Chatterjee & Co. Ltd, 15, College Street; both of Calcutta.

1948. Roll 16844.—Process of manufacturing biscuits appeared in February 1925 issue. For methylated spirit manufacture you are referred to an article on wood distillation that appeared in September 1925 issue.

1949. B. D., Amritsar.—Cleanse good potatoes, boil, peel and cut them in slices. Now add to 100 parts of potatoes 4 of salts; then dry thoroughly and grind them to flour. Keep the product in hermetically sealed tin containers. The product is a good potato flour.

1950. S. M. Z., Rawalpindi.—An article on boot polish manufacture appeared in June 1923 issue.

1952. S. A. G., Rangoon.—Sources of the drugs mentioned by you are not traceable.

1954. M. N., Bahawalpur State.—For polishing bronze and copper you may use metal polish available in the market. It may be had of Dutt Bros & Co, 38, Clive Street, Calcutta.

1955. D. C., Delhi.—Degrees given by Educational Institute, Allahabad and Universal Institute, Mahua are not recognised by Government.

1959. B. L. M. B., Barpara.—Wants to be introduced to importers of buttons in Basra, Mesopotamia, Nova Goa and Persian Gulf.

1960. M. L. R., Bangalore City.—Inks are manufactured by Bengal Ink Factory, 49/1B, Raja Raj Bullav Street, Sulav Ink Factory, 136, Upper Chitpur Road and Baghbazar Ink Factory, 14, Lakshmi Dutt Lane; all of Calcutta. Khaddar cloths may be supplied by Hemprava Bhandar, 22, Cornwallis Street and Desh Bandhu Bastralaya, 21, Cornwallis Street; both of Calcutta. Fountain pens are manufactured by F. N. Gupta & Co., 12, Belliaghata Road, Calcutta. Umbrella cloths may be bought of Tincari Dulal Chand, 33, Khengraputty, Calcutta. Banians are manufactured by Tollygunge Hosiery Factory, 27/35, Russa Road, Tollygunge, Calcutta; Pabna Silpa Sanjibani Co., Pabna; Gujrat Hosiery Factory, Ahmedabad and Aryan Hosiery Factory, Bangalore. For book on ink

manufacture write to Chackraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

1961. T. B. S., Vizagapatam.—For good production of lac you are referred to an article on lac inoculation in November 1921 issue of **Industry**.

1962. P. H., Akyab.—It will be advisable for you to buy umbrella fittings in India and by proper adjustment of these and umbrella cloths you may manufacture umbrellas. In the beginning you may invest Rs. 5000. Umbrella fittings may be supplied by Nafar Chandra Atta, 43, Armenian Street, Calcutta and umbrella cloths may be had of Tejpal Bredhichand, 7/1, Armenian Street, Calcutta.

1964. M. L. A., Jullundur.—**Commercial India** is also published from this office. There is perhaps no good industrial journal in India now except **Industry**.

1965. R. S. Sharma.—For securing agency you may go through the Sale and Exchange pages of **Industry** and communicate with the parties willing to open agencies in various parts of the country.

1967. S. K., Jodhpur.—You may try wheat flour for adulterating 'gula'

1968. A. B. M., Deoghar.—You may manufacture small articles and sell them either locally or at Calcutta. For this purpose you will have to make arrangement with the stationers of Radha Bazar and Canning Street. Used stamps have no regular market but sometimes rare stamps fetch handsome price. Piggery when conducted ably proves profitable. For this purpose you will have to invest Rs. 1000. Wants to be put in touch with betel leaf dealers of Serampore, Howrah.

1909. A. B. S. C., Vizianagram.—Crucibles of all descriptions may be supplied by Scientific Instrument Co. Ltd., Johnstonganj, Allahabad and Scientific Supplies Co., 29-32, College St., Market, Calcutta. Brass sheets, ingots, etc., may be had of Balmer Lawrie & Co., 103, Clive Street, Calcutta.

1970. I. M. C., Salem.—For hand embroidery machines, write to Laurel Novelty Co., 43, Park Street, Calcutta.

1971. Ram Lall Bazaz, P. O. Box 608, Nairobi, Kenya Colony, British East Africa—Brazil wood, lodhwood, annotto seed, kusum flowers, myrobalans, Bombay arrowroot, etc., may be bought of Jadu Nath Bhar, Hukahputty, Barabazar, Calcutta. Babla is acacia arabica. Jack-fruit is a kind of fruit. For juice of pati lime procure some limes locally and express juice from them. Black berry is also a kind of fruit small in size and black in colour. Procure some coconuts and cut them when milk will come out. Saltpetre may be supplied by Surendra Nath Daw & Sons, 3, Dayahatta St., Barabazar and Akhoy Kumar Dutt & Sons, 2, Banstala Street, Barabazar; both of Calcutta. Other chemicals you require may be had of B. K. Paul & C., 1-3, Bonfields Lane, Calcutta.

1973. G. C. M., Lewé.—Your enquiry is receiving our attention.

1975. C. B. D., Nadiad.—It is not possible to destroy hair permanently. First prepare soda lye. Take a part of the oil or fat used and heat it when it is exceedingly hot put the powdered rosin in it. When all the rosin is completely dissolved mix this compound in the rest of the oil and let it cool. Now mix the lye and pour it into the frame.

1976. B. K. M., Karachi.—A good recipe of depilatory soap will be found in April 1925. The colour of fabrics already dyed may be made brighter and fast by performing the following operations on the same. Steep $\frac{1}{2}$ lb. of soapnut into 1 lb. of water and let them remain there for 3 or 4 hours. Then rinse them and remove the loose rinds and heat the water. Plunge the dyed fabric into this and wait from 2 to 3 hours. Then squeeze out the water and put it again into the under-mentioned preparation which is obtained by pouring the juice of lemon or citron into hot water. The fabric may also be steeped in a

FOR THE COLD SEASON.

Woolen Danigol & Snuff and Navy Blue Colours Over Coat Rs. 12/8; Sporting Coat Rs. 9, Serge Coat Rs. 9/8, Cloth—Swadeshi, Finally Superior. Goods are smart looking serviceable and cheap. $\frac{1}{2}$ with order.

MAHINDRAKAR BROS.,

Bombay No. 4, or 12, & Poona City.

solution obtained by boiling 1/16 lb. of tamarind in 1 lb. of water and then straining through a piece of cloth.

1980. M. D. B., Faizpur.—Recipes of medicated and sweet scented snuff appeared in November 1924 issue, you should stock good quality tea. For the required machine enquire of Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta.

1981. G. R., Palampur Kangra Valley.—Wood distillation is carried on in Mysore. You may write to the authorities of that State for particulars. The products may be disposed of if suitably priced.

1982. K. S., Lahore.—In watch repairing and cleaning book knowledge will be of little help to you. You will require practical training; for this purpose you may try to be an apprentice in a watch repairing concern. For books on the subject enquire of Thacker Spink & Co, 3, Esplanade East, Calcutta.

1983. M. G., Shillong—You may use marking ink the recipes of which appeared in May 1924 and September 1923 issues of *Industry*.

1984. K. G. V. R., Karikal.—Laces may be supplied by Bloch Adolphe, Sihlstrasse 3 Zurich, Switzerland and A. Boucharlat, rue Desirce 2 Lyons France. Silk yarn may be supplied by Chukyo Bocki Kaisha Ltd, 3, Minami Kyutaromachi and T. Matsumoto, 4 Chome, Bingamachi; both of Osaka, Japan. For extracting oils from flowers you are referred to Perfumery Special Number (September, 1924) of *Industry*. You may consult Popular Mechanics Magazine, Chicago U. S. A, Everyday Science, 9-11, Cursitor Street, Chancery Lane London, E. C. 4., and Popular Science Shiftings, 123, Fleet Street, London, E. C. 4.

1985. E. V. U., Travancore—Buttons are manufactured by East India Button Co, 34, Ganaktuly, Philkhana, Dacca, Tirhoot Moon Button Factory, Sahebgunj, Mehshi, Champaran, J. W. Schnockel & Sohn, Huhner posten, 8, Hamburg Germany; Patent Button Co, Waterbury, Connecticut, U. S. A., McKee & Bliven Button Co., 256, Church Street, New York, U. S. A.

1986. R. S. I., Travancore.—Apparatus for extracting fruit juice may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

1988. V. B. W., Ahmedabad.—Wants an expert in renovating files.

1989. U. D. S., Raghunathpur.—Formula of laundry soap will be found in July 1925 issue. For laundry soap you need not bleach mohua oil and til oil. Melt the soap pieces by applying heat and after cooling pour in the frame.

1990. D. V., Meerut City.—All the woods used in the manufacture of natural colours may be supplied by Banshidhar Dutt & Sons., 126, Khengraputty, Barabazar, Calcutta. Recipes of tooth powder and tooth paste will be found in August 1922, issue. You may wash woollen clothes in soapnut solution.

1993. B. K. R., Dacca.—To prevent fermentation you may use some drops of alcohol in the mixture. For ayurvedic books enquire of N. N. Sen & Co., Ltd., 19, Lower Chitpur Road, Calcutta.

1994. K. M. N., Chittoor.—Optical goods may be supplied by Stephens & Co. Ltd., 275, Bowbazar Street, Calcutta, Lawrence & Mayo Ltd, 44, Hornby Road, Fort, Bombay and W. E. Smith & Co. Ltd., Mount Road, Madras. Rolled gold articles may be had of Teckchand Gangaram, Karachi, Ganapath & Co., Khetwadi, P. O. Bombay and Mahomedally Jaferje, 37-4, and 37-5, Canning Street, Calcutta.

1995. M. A. A. K., Makhtal.—For particulars of the joint stock company write to the Registrar, Joint Stock Companies, Government Place, Calcutta.

1996. G. C. M., Kaoraid.—Butea frondosa is known as "palas" in Bengali. Schleicheria trijuga is known as "kosum" "Gausam" and "kusum" in Hindi. Its Bengali equivalent is not known. Pterocarpus macrocarpus is known as "patauk" in Burma. Wants to buy the heart wood of the above three and acacia catechu.

1997. A. H., Jacobabad.—Harmoniums may be bought of Dwarkin & Sons, Dalhousie Sq., East, Calcutta. Hectrograph ink may be had of Bengal Miscellany Ltd., 99, Manicktola Main Rd

Calcutta. The following is a list of chemists; The Punjab Chemical Works, Shahdara, Lahore; Nand Lall Acid Factory, Naulakha, Lahore; B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta; Bengal Chemical & Pharmaceutical Works Ltd, 15, College Square, Calcutta; D. Waldie & Co., British Indian Street, Calcutta; The Eastern Chemical Co. Agents Shaw Wallace & Co., 2, Ballard Estate, Bombay and The Bhavnagar Chemical Works, Vartej, Kathiawar. There are many monthly journals at Calcutta, Bombay and Madras. It is not possible to name them all in these columns, so it will be advisable for you to consult Thacker's Indian Directory to be had of Thacker Spink & Co, 3, Esplanade East, Calcutta. However, names of a few journals follow: (1) Modern Review, 91, Upper Circular Rd, Calcutta. (2) East and West, Caxton Press, Freie Road, Bombay and (3) Indian Review, published by G. A. Natesan & Co, 3 & 4, Sunkurama St, Madras. Can supply hides and skins.

1998 B. N. B, Hubli.—For learning the process of casting bronze statues you will have to undergo a course of training. You may write to the Principal, Government School of Art, Chowringhee, Calcutta and Mayo School of Art, Lahore.

2000 M. S. K. R, Bangalore—Wants to be put in touch with dealers of black fur.

2001. L. G. D, Gadag—Bone black is prepared by carbonising all kinds of animal bones. Process of extracting gold from alloys appeared in February 1922 issue.

2002. N. T. B, Timarni.—For Derby tickets write to the Secretary, Royal Calcutta Turf Club, 13 Russel Street, Calcutta.

2007. L. S., Quetta—Please explain clearly your requirement. A recipe of rubber solution appears elsewhere in this issue.

2008. D. D. H, Simla.—Your query appears elsewhere in this issue.

2009. R. L. G, Nasirabad.—Rare stamps are stamps not easily available. To neutralise the saline taste of pulse prepared convert it to some sour foodstuff. By New Idea Columns we mean the columns in which ideas for small capitalists appear

2012. C. C., Trichinopoly.—Wants to be put in touch with manufacturers of drugs.

2014. S. K., Colombo.—Incense sticks are manufactured by Ayurvedic Medical and Perfumery Works, Mysore and K. T. Appannah & Co., Bangalore. Ivory articles may be supplied by Ghosh Dastidar & Co., 125, Bow Bazar Street, Matri Bhandar, 206, Cornwallis Street, and The Bengal Industrial Co., 5-7, Russa Road South; all of Calcutta. Wants pure cow ghee.

2015. N. S. S., Bombay.—For bronze used in medals mix fifty parts of copper with 4 of tin.

2016. G. S., Kotah.—Wants to be put in touch with dealers in secondhand woollen coats, grain, sundries and vegetables.

2017. R. S. N. B, Kapurthala.—For starting small prospective industries go through September issue of Industry. Your other query is not in our line.

2018 R. L. G, Nasirabad—If your cloth be dyed with fast colour it will be difficult for you to bleach it, if otherwise you may try bleaching powder available in the market. For improvement of physical and mental power you may communicate with our advertisers. For strength of eye sight consult a specialist.

2019. P. M., Allahabad—The machine supplier will give you instruction for manufacturing lemon drops in that particular machine. Skuse's Complete Confectioner may be had of Thacker Spink & Co, 3, Esplanade East, Calcutta. For printing show card write to Karnahl & Co., Reudnitz, Comeniusstrasse, 17, Leipzig and C. L. Keller, Brandenburgstrasse 43, Berlin; both of Germany.

2022. D. C. K., Lahore—Precious stone cutting tools may be supplied by L. Basak & Co., 5, Old Court House Corner, Calcutta.

2024. M. H. S., Quetta.—Mineral water essences may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. Soda water machines may be supplied by Vitaldas Karsondas, 364, Upper Duncan Road, Two Tanks, Bombay 8 and Amin Chand Mehra & Sons, 34, Armenian Street, Calcutta

2025. S. R., Rangpore.—During the year 1923-24 354,074 dozen of brushes worth Rs. 11,27,856 were imported in India. Brushes are mostly consumed by municipalities, army departments, etc. For a list of printers consult Thacker's Directory. Statistics for country made brushes are not available hence figure of its consumption cannot be ascertained.

2026. G. C. K., Hubli.—Hand-power grain splitting machines may be supplied by T. E. Thomson & Co., Esplanade East, Calcutta. Hand-power rice husking machines may be bought of Ghatak & Co., Rai Bahadur Road, Behala, Calcutta. Weaving looms may be had of B. D. Bery & Co., 43, Ripon Street, Calcutta. Agricultural implements may be supplied by Kirloskar Bros., Kirloskar Vadi, Poona.

2027. S. N. S., Bijapur.—For books on bakery write to Thacker Spink & Co., 3, Esplanade East, Calcutta.

2028. H. R. M., Ahmedabad.—Optical goods may be supplied by American Optical Co. Ltd, 39 Hatton Garden, London, E. C. 1.; Scottish Optical Mnfg. Co., 20, Dixon Street, Glasgow; Winter Willi, Weissnfelderstrasse 2, Leipzig, Germany; General Optical Co., Inc; Mt. Vernon, New York, U. S. A. and Stephens & Co. Ltd., 275, Bow Bazar Street, Calcutta.

2030. S. N. M., Kanauj.—Tin toys are manufactured by Jacques Kellermann & Co., Kopenickerstrasse, Berlin, S. O. 16, Germany; Arthur Arnold, Denisstrasse, 3, Nurnberg, Germany and Kanai Shoten, Takagaki-cho, Kitano, Kitaku, Osaka, Japan. Toys are imported by K. B. Nan, 233, Old China Bazar Street, Calcutta.

2032. S. A. C., Shanmaganathapuram.—For securing license for fire works write to the local authorities. The following are some of the trade journals required by you. Norwegian Trade Review, published by The Trade Intelligence Bureau of Norway, Christiania, Norway; Swiss Exporter, Chamber of Commerce, Berne, Switzerland and Swedish Export Journal, published by Export Association of Sweden, Stockholm, Sweden. For securing agencies go through Sale and Exchange pages of Industry.

2033. T. X. L., Rangoon.—There is no process of transmuting metals. Recently a German scientist claimed to have transmuted mercury into gold by an elaborate and costly process. The effect of the transmutation of iron into copper on industry depends on the cost of manufacture.

2034. E. K. Jaffna.—Picture post cards may be supplied by B. M. Malabari, 3, Nilmadhab Sen Lane, and Majumder Agency, 64, Machuabazar Street; both of Calcutta.

2035. H. R. R., Kolar.—The sample you sent is a kind of yellow ochre used for white washing buildings.

2036. H. S. G., Hubli.—For books on pearl and precious stone testing write to Thacker Spink & Co., 3, Esplanade East, Calcutta.

2037. G. S., Kotah.—For importing toy pistol you need not take license. For grains enquire of Chimanlal Chandulal, Dayashanker Katra, Khari Bazar, Delhi; Bajpie & Co., Swallow Lane, Calcutta and H. C. Mehta & Bros., Samuel Street, Vadgadi Bombay.

2038. G. L. G. S., Rawalpindi.—The following are the pencil manufacturers as required by you: Eagle Pencil Co., 1150 Broadway, New York City, U. S. A.; Johann Faber, A-G, Schonzackerstrasse 33, Nurnberg, Germany and George & Rowndy, 10|11, Percy Street, London W. 1.

2039. R. F., Baroda.—Barytes may be supplied by Williamson & Co., Oldham Road, Gaya.

2040. L. J. R. M. R., Nankana Sahib.—Motors and motor cycles may be bought of Karachi Motor Car Co., McLeod Road, Karachi; Royal Cycle & Motor Co., Garden Road, Karachi; Karachi Cycle & Motor Co., Elphinstone Street, Karachi; Imperial Motor & Cycle Co, Kashmir Gate, Delhi; T. R. Pratt, Kashmir Gate, Delhi and Clive Motor & Engineering Works Ltd., Kashmir Gate, Delhi. Motor accessories may also be bought of the above firms.

2042. B. S., Prome.—Flour mills may be supplied by Jessop & Co., 85, Clive Street and Burn & Co., 7, Hastings Street; both of Calcutta.

2043. M. M. I., Tisaiyanvilai.—Match chemicals may be bought of Oriental Industrial Co., 9, Bonfields Lane, Calcutta and Calcutta Chemical Co., 35/1, Panditia Road, Ballygunge, Calcutta.

2044. J. K. M., Dacca.—For the required appliance enquire of Scientific Instrument Co. Ltd., Johnstonganj, Allahabad; Scientific Supplies Co., 29-32, College Street Market and B. K. Paul & Co., 1-3, Bonfields Lane; last two of Calcutta. Wants to buy secondhand gunny bags. Can supply secondhand kerosine tins.

2045. S. S., Madanapalle.—For cinema film machine write to J. F. Madan & Co. Ltd., 5, Dharamtola Street, Calcutta.

2046. N. C. K. C., Etikoppaka.—Toys may be bought of K. B. Nan, 233, Old China Bazar Street, Calcutta.

2047. B. O., Honavar.—Tablet making machines may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar St., Calcutta.

2048. E. A. I., Erode.—Use good quality soap in snow cream, tooth powder and tooth paste.

2050. M. B. M., Badulla.—Ivory may be softened by soaking them for 3 or 4 days in a solution of 1 oz. of spirit of nitric acid in 3 oz. distilled water.

2051. K. N., Etah.—Aluminium sheets may be bought of Armstrongs & Main Ltd., York Bldg, Hornby Road, Bombay and J. D. Jones & Co., Clive Bldgs, 8, Clive Street, Calcutta. Imitation gold may be bought of H. Banerjee & Co., 1, Garanhatta Lane, Calcutta. Clays you want may be bought of Calcutta Mineral Supply Co., 31, Jackson Lane, Calcutta and Williamson & Co., Oldham Road, Gaya. Chemicals may be supplied by B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. Colours may be had of Aminchand Mehra & Sons, 34, Armenian Street, Calcutta.

2053. S. K. A., Lashkar.—You may consult Handbook for Indian Students published by High Commissioner for India, 42, Grosvenor Garden, London, S. W. 1.

2054. N. D., Sargodha.—For Derby tickets write to Secretary, Royal Calcutta Turf Club Ltd., Russel Street, Calcutta.

2057. G. D. P., Banda.—Industrial books may be bought of Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta. Hydrometers may be supplied by Bengal Scientific Supplies Co., 29-32, College Street Market, Calcutta. Soap colours and scents may be had of Sickri & Co., 55/8, Canning Street, Calcutta. Soap moulds may be supplied by S. A. Manan, 82, Machuabazar Street, P. O. Amherst Street, Calcutta.

2061. H. P. A., Jubbulpore.—Process of storing potatoes appeared in July 1924 issue.

2063. J. M. S., Bhagwangola.—For the report of the middle-class unemployment write to the Director of Industries Bengal, 40A, Free School Street, Calcutta.

2064. V. K. A. K., Madras.—We do not deal in books except our own publications. We have no book on chemical industry. Books on the subject may be bought of Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

2069. P. C. R. C., Nellore.—Shellac may be bought of Angelo Bros, Post Box 68, Calcutta.

2070. G. C. M. Sambalpur.—Shawl may be bought of Oriental Carpet Mfg. Co., Amritsar; Naruddin Pandit, Srinagar; Jabbar Shah, Srinagar and C. M. Hadow & Co.'s Carpet Weaving Factory, Srinagar; last three of Kashmir.

2071. M. M. V., Raygram.—Process of coir making from coconut shell appeared in January 1925 issue. In that formula please read buried in place of burnt in the 4th line.

2072. R. A., Bombay.—Preparation of sugar substitute is still in its experimental stage.

Kaminia-Oil.

Used by all nations for preserving and beautifying the hair and keeping the head cool and brain refreshed. Rs. 1-4 per bottle.

(Registered)

**TRY IT ONCE.
SOLD EVERYWHERE.**

2073. M. K. R., Laikynsew.—For securing agencies of manufactured goods write direct to parties. Addresses will be found in these columns. For selling oranges advertise in pages of newspapers and periodicals.

2075. A. K., Yenangyoung.—Hair dyes may be bought of Jaswant Bros., Muttra.

2077. P. A. S., Masulipatam.—Electrical goods may be supplied by Electro-Zertrum G. m. b. H., Burgstrasse 28, Berlin, Germany and Electrolampe Methver and Muhlmann, Dirksenstrasse 45, Berlin, Germany. Goldsmith's tools may be bought of L. Basack & Co., 5, Old Court House Corner, Calcutta. Wool may be supplied by Meer Abdur Azizur Rahman, Mahi Manzil, Katra Ahluwalia and Mathirdas Sirpal & Sons, Katfa Ahluwalia; both of of Amritsar.

2078. N. N. M., Patna.—The Chemicals you require may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

2079. G. T. M., Bala Banki.—Pencil cigarette lighter may be had of The Union Trading Co., 166, Harrison Road, Calcutta. Date stamps may be bought of B. N. Bysack, 111, Ram Chandra Ghose's Lane, P. O. Beadon Street, Calcutta.

2080. K. R. R. R., Arsikere.—You may consult Handbook of Plainain Fibre and Fruit Industry by J. K. Sarkar to be had of the author at Sukchar, Bengal. Plainain fibre extracting machines may be bought of Brady & Co., Bombay and Oriental Machinery Supply Agency Ltd., 201, Lall Bazar Street, Calcutta.

2082. K. V. Buldana.—Toys may be bought of K. B. Nan, 233, Old China Bazar Street, Calcutta.

2083. J. M. G. S., Ahmedabad.—Optical goods may be supplied by Dupaul Young Optical Co., South Bridge, Massachusetts,

U. S. A.; London Optical Co., 344 to 354, Gray's Inn Road, London, W. C. 1., and Manchester Optical Co. Ltd., 3, Kilvert's Bldgs, 17, Wilthy Globe, Manchester. As regards firms of India you may enquire of Stephens & Co. Ltd., 275, Bowbazar Street and Lawrence & Mayo, 16, Old Court House Street; both of Calcutta. For the required commercial books enquire of Kamala Book Depot Ltd, 15, College Sqr., Calcutta.

2084. S. W. F., Sylhet.—Chemicals may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. Dyes may be supplied by Amin Chand Mehra & Sons, 34, Armenian Street, and Hansraj Vishram & Co, 13, David Joseph Lane; both of Calcutta. For sterilizing machines enquire of Bengal Scientific Supplies Co., 29-32, College Street Market, Calcutta.

2086. M. L. S., Nasirabad.—For Indian addresses consult Thacker's Indian Directory to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta. For German addresses you should consult a German directory that may be supplied by Consul-General for Germany, 2, Store Road, Ballygunge, Calcutta.

2088. P. V. A., Trichur.—Your letter has already been replied by post.

2090. R. P. C., Madras.—Lever lid tin tops may be supplied by Venesta Ltd., 4, Mango Lane, Calcutta.

2091. S. C., Jhansi.—Rubber soles may be supplied by Bombay Sports Depot, 13-C, Old Court House Street, Calcutta.

2092. M. A., Rutlam.—Recipes of hair lotion, face powder and lavender water will be found in September 1924 issue. Formula of face cream appeared in July 1924 issue. Formula of toilet soap will be found in April 1925 issue. Formula of washing soap resembling sunlight soap appeared in August 1921 issue. Process of preparation of ink tablet appeared in July 1924 issue. Recipe of fountain pen ink will be found in August 1925 issue. Recipe of lime juice glycerine appeared in April 1925 issue.

2093. T. T. N., Cuddalore.—Your enquiry is receiving our attention

EARN RS. 100 TO RS. 500.

Monthly by reading 8 Big Plans. No previous experience or study required. You can start earning as soon as you read this wonderful book. For further particulars of the book, apply enclosing two half anna stamps to—R. SESHAN, Agent, 1046 E. A. Street, (Trichinopoly). S. I

2094. K. C. P., Baripadu.—Recipe of gold enamel paint appeared in August 1924 issue. An article on enamelling ornaments will appear in an early issue.

2095. M. M. B., Bombay.—Carpets may be bought of C. M. Hadow & Co's Carpet Weaving Factory, Srinagar, Kashmir. Curtains and pillow cases may be had of M. Karim Bux, Chandney Chawk, Calcutta. An article on paint manufacture appeared in April 1925 issue.

2096. H. R., Barmhat.—For cigars enquire of Victoria Cigar Works, 64, Tseekai Maung Taulay Street, Rangoon and Johannes & Co., C Road, Mandalay; both of Burma. Cigar papers may be supplied by Ghosh Bros., 63-J, Radha Bazar Street, Calcutta.

2097. K. A. K. M., Vedesandur.—For disposing of cigars write to Australian Manufacturing & Importing Co. Ltd., 5-11, Parker St., Sydney, Australia and W. J. Dwyer, 360, Brooke Street, Melbourne, Australia.

2098. C. P. R., Rajahmundry.—The following is the list of lace merchants of Australia. Anderson Meyer & Co. Ltd., 56, Market St., Sydney; Groves & Co. Ltd., 91A, York Street, Sydney; O. E. Burbank & Co., Flinders Lane, Melbourne; Millingen & Wood, Charlotte St., Brisbane and Cohen Benjamin, Charlotte St., Brisbane. The following are some of the commission agents of Calcutta: (1) East & West Trading Co., 16, Bonfields Lane, (2) M. B. Mirza & Co., Suraj Bldgs, Colootola and (3) Noorani Sons & Co., 6, Bentinck Street.

2099. R. L. K., Sargodha.—Tailoring is taught at Calcutta Commercial Institute, College Street Market and Maharaja Kasimbazar's Polytechnic Institute, 1, Nanda Lal Bose Lane, Bagh Bazar; both of Calcutta. For training in electrical and mechanical engineering write to Bengal Engineering College, Shibpur, Howrah and Bengal Technical Institute, Jadabpur, Dhakuria, 24 Parg. For learning weaving you may communicate with the Principal, Government Weaving Institute, Serampore, Howrah.

2100. E. C. S., Tuticorin.—To communicate with any querist write him with number and initials under care of Industry when your letters will be duly redirected.

2101. R. P. N., Kayalpatnam.—You may wash cloths with washing soap.

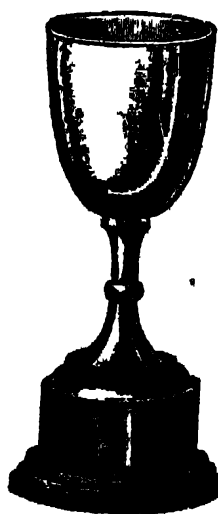
2102. A. S., Nagercoil.—For starting leather industry consult an expert.

2106. M. A., Madras.—Fancy goods may be supplied by Mahomedally Jaferje, 37/4 & 37/5, Canning St. and Laurel Novelty Co., 43, Park St.; both of Calcutta. Stationery goods are imported by M. E. Dadabhoj & Sons, 55, Canning St., and Nilmony Halder & Co., 106, Radha Bazar St.; both of Calcutta. Sundry goods are imported by D. Manek & Co., Bunder Road, Karachi.

2108. V. J. N. N. Kurnool.—Magical appliances may be bought of our advertisers, Magical Co., Jhansi. For selling various kinds of ores and stones advertise in the pages of newspapers and periodicals.

2109. K. P. B., Puri.—For soaps manufactured by P. A. B. Punjab Soap Factory, 55, Canning Street, Calcutta, write direct to the firm. Bagmari soaps may be bought of Mohamed Enamulla & Co., 8 & 9, Colootola St., Calcutta. Dietz lanterns may be supplied by Elliot & Co., 6, Clive Row, Calcutta. Malted milk of various descriptions may be supplied by Allen & Hansburys, P.O. Box 2198, Calcutta. For stationery goods refer to No. 2106.

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Notices and Reviews.

Photo Rings.

We are glad to receive a pair of nice rings with miniature photo pictures from the Behari Advertising Agency, Askunda Bazar, Muttra.

Calendars.

We acknowledge with thanks the receipt of eight calendars for 1926 with an ingenious picture from Bindahnee Medical Hall, Kemmenline P.O., Rangoon.

Railway Training.

Intending candidates for any service in the Railways can have postal tuition to qualify themselves from the Railway Training Institute, Anarkali, Lahore.

Engineering by Correspondence.

It would appear from the Prospectus of the Civil Engineering School, Sirohi that lessons on engineering courses are imparted even through correspondence. There are satisfactory arrangements for training overseers, sub-overseers, draughts-men, traciers and the like.

A Cereal Food.

The "Cereal Food Drink," according to its manufacturers, The Godavari Industrial Trading Co., Narsapur, S. India, is made of choice cereals so compounded as to retain their aroma and taste. It is also claimed to be nutritious and is recommended as a substitute for tea and coffee.

Ink Powder.

We have received from the Indo-German Trading Co., of Cocanada a sample packet of ink powder which on being dissolved in water yields good ink.

Ink Spoon.

The "Ink Spoon" is a tiny little thing but attached to the penholder it ensures a long regulated flow of ink to the nib. Messrs. Mukut Bros., No. 1, Guzri Bazar, Meerut, are offering this novelty

A Blotter.

Unlike other common blotters the Josti Permanent Blotter can be used over and over again and as such will be found handy on the writing table. It may be had of The Deccan Stationery Mart, Post Grant Road, Bombay No. 7.

A Trade Journal.

Mercantile Miscellany. Published by Messrs. Soma Sons, Ltd, 34, Broadway, Madras. This new monthly is devoted exclusively to commerce trade, industry and general economic development. We wish the journal every success.

Toilet Scents.

Paul's Rose Water Essence, as its name signifies, is a highly concentrated preparation, producing as it does rose water of good quality, on being mixed with pure water in the ratio of 1 to 11.

Mohini Pure Scent is another floral abstract without spirit used in perfuming toilet articles such as hair oil, soap, etc. These and similar other toilet scents are prepared by Messrs. S Paul & Co, Perfumers, 4, Hospital Street, Calcutta who are recommended to our readers.

Journal on Therapeutics.

"Suchikitsa". Edited by Dr. Harihar Banerjee, M B, Office 87, Durga Charan Mitter Street, Calcutta. Annual subscription Rs. 3/6 only.

We welcome the appearance of this journal on therapeutics for the reason, amongst others, that it is being conducted in a Vernacular language, to wit, Bengali. Considering the havoc wrought annually in Bengal by a host of deadly diseases, the magazine under review will go a long way to educate her people about correct diagnosis and proper treatment. We hope that it will continue in its useful career by disseminating knowledge of health, hygiene, sanitation, etc., to the suffering Bengalees.

Trade Enquiries.

[To communicate with any party write him direct with name and address given below, mentioning INDUSTRY.]

1999. M. Das Gupta, Bhowra, P. O. Box 102, Jamadaba, Manbhum.—Wants to be put in touch with buyers of iron ore.

2012. Cargills & Co., Woriur, Trichinopoly.—Can supply South Indian quality tobacco and its stems.

2023. D. Row, Civil Lines, Ludhiana.—Wants to be put in touch with dealers in Coconuts.

2056. Sadhu Ram Gupta, Rohtak.—Wants to be introduced to castor cultivators

2062 H. S. Khosla & Co, Outside Sahalmi Gate, Lahore.—Desire to be put in touch with the wholesale suppliers of pepper.

2081. Parekh Bros., Vartex, Kathiwar.—Desire to be introduced to suppliers of lead ores and crude litharge.

2086. The Krishna Railway Claims Agency, Nasirabad.—Can supply *ak* cotton and tamarind

2102 A. Sivathanu, Vadesary, Nagercoil.—Wants an expert in leather tanning.

2107. Ayurvedic Medical Hall, Coringa, Godavary.—Requires Momia alias Mommaye.

2113. Shankar Ganpat, Range Officer, Garhi, Dist. Balaghat.—Can supply rapeseed oil.

2121 Ma Ma Gyi & Sons, 365, 32nd Street, Mandalay.—Desire to be put in touch with dealers in velvet, locks for leather suit case and leather suit of Cawnpore.

2124. M. B Hussain, Mangalgarh, Darbhanga.—Wishes to invest Rs. 2000 in a profitable business.

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2214. The Imperial Co., of Commerce, Post Box No. 702, Bombay.—Desire to buy citronella oil.

2248. Williamson & Co, Daltongunge, Palamau.—Wish to be introduced to parties interested in coal, iron, mica, dolomite, cement, felspar and lime stone.

2280. S. N. Nasir, Shamsabad, Fatehgarh.—Wants to be put in touch with buyers of bristles.

DECEMBER ISSUE OF INDUSTRY.

(In the Press)

The December issue of INDUSTRY will be a special number dealing with the unemployment problem and its practical solution. Besides it will contain the usual features such as formulas, recipes, queries and replies, etc. Any friend of our subscriber may have a copy free as sample.

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"Better Days for the Unemployed"

The unemployment question has become the crank of our society. People are starving for want of employment and the affection has apparently spread among the whole of the middle class people, educated yet unfortunate.

IN THE DECEMBER SPECIAL ISSUE

Industry

Deals with the subject in a practical way by which string of the unemployment may be reduced to a minimum.

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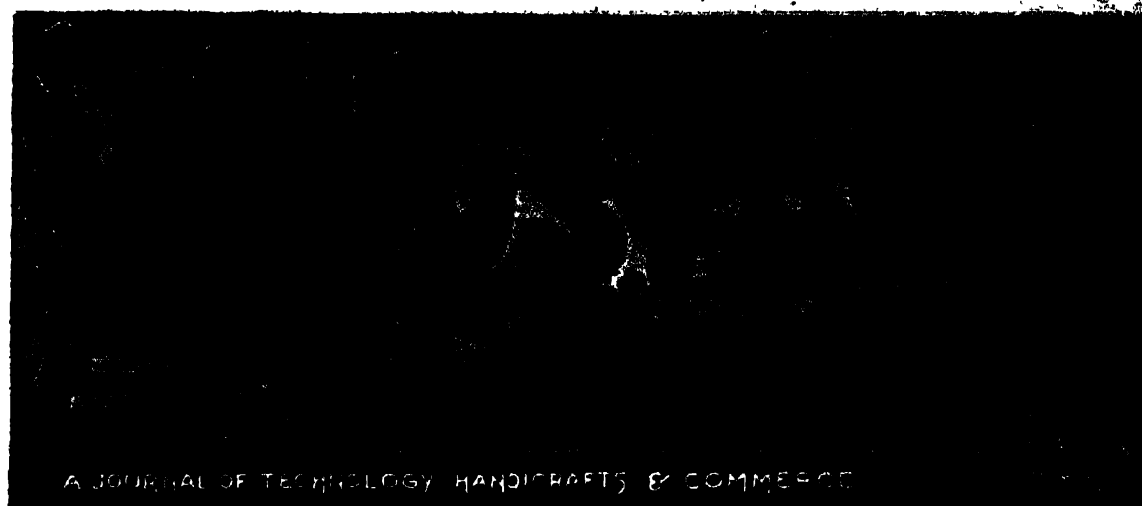
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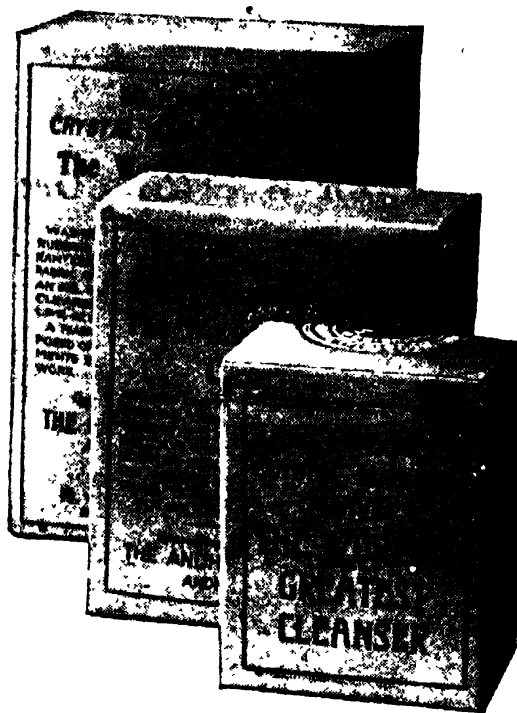
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VOL. XVI

CALCUTTA, DECEMBER, 1925.

NO. 189.

BETTER DAYS FOR THE UNEMPLOYED.

FOR the last few months we are dealing with the unemployment question. We are flooded with letters and suggestions from our readers. We read with gratification the appreciation of our solution. Although space would not permit us to print even some of them we hope to give their substances in dealing on the same subject.

Indeed, we seek for better days for the unemployed. The sting of unemployment although spreading rapidly is not a very aged one. Quarter of a century back the problem was not so keen. Yet the whole of the middle class men are sufferers. Suffer we must, undoubtedly, for the sin of forsaking our village homes and rushing to city-civilization not exactly for food but for earning means for the excitement of a life of pride and pleasure. We are now face to face with a problem out of which we must find a way—a way that may bring relief to the whole nation.

Who are the biggest sufferers of the unemployment situation? First, the middle class people. Our universities turn out about 70,000 graduates and under-graduates every year. Nearly equal number leave off their study before entering into the portals of the university. They are swelling the rank of the unemployed middle class every year. The professional training—such as law, medicine, engineering—absorbs about 3,000 of these people. Service and education absorb about half of this number. Service in commercial firms absorbs another equal number or a little more. Of the 140,000 of educated and literate middle class people, not even ten per cent., can procure employment. And every year this huge army of the unemployed is growing with the yearly turn-outs of about the dozen universities throughout the country.

You cannot check the rising course of education. The nation is thirsty for

it. The education we want more and more—none would be too much. Yet we must find out means of livelihood for the unemployed educated people.

Besides the professional and literary employment referred to above we have got some of the technical occupations which absorb over thirty-three millions of our population. * These include about eight million for textile, three millions and a half for wood industry, 18 lacs for metal industry, 22 lacs for ceramics, 12 lacs for chemical industry, 31 lacs for food industry, 74 lacs for dressing material industry, 17 lacs for building industry, 17 lacs for jewellery industry, 25 lacs for other miscellaneous industries. These are both skilled and unskilled but generally uneducated and unprogressive labourers. The educated middle class people has a very big scope to enter into the field of these industries not as labourers but as trained and skilled captains and foremen.

The second class of the sufferers of unemployment comes from the labouring classes. They suffer without any noise—the greater they suffer the less we hear from them. Of the whole of our population 10 crores of male including children and 5 crores of females including girls have some or other kinds of occupation and others which cover a population of over 18 crores including little children and old people, depend upon the earnings of the former. But of the 15 crores of working people only 5 crores who are employed in industrial pursuits and trading besides agriculture have been able to procure occupation all the year round. Others which come up

to the huge figure of 10 crores can have in their agricultural pursuits work 4 or 5 months only in the year. They spend the other half of the year without any work and as such without sufficient food also. These starving people suffer from low vitality and become subject to disease and consequent vitiation of the whole nation with indolence, lethargy, despair, and premature death. Thus we find around us a starving population in famishment for ages, timid and slothful, despairing of anything in life, without hope of amelioration, of development, of betterment of their age-old suffering.

The necessity of our people is food—more food; nutritious and substantial food in sufficient quantity. The energy of the nation should be devoted to the production of food in which the individuals would have individual interest. How can we do that? We have been taught that our lands have been divided and subdivided into pieces rendering them capable of no improvement; we have been taught that our peasants are steeped in indolence and ignorance incapable of any advancement. We are taught that our classes are incapable of joining the masses in the production of the food. . But are these inevitable facts?

The staple foods in the country are rice and wheat. These are exported in big quantities and when there are rich foreign buyers present in the market we cannot control their prices. Besides these the principal articles of food that would supplement the rice and wheat are fruit, milk, fish, meat and egg. These may supply deficiencies in our food not

only in quantity but in quality also. But production of these has so much been restricted that these have grown to be luxuries not only to the poor people but also to others. We can cheapen these by extensive production and by removing the caste ring among their producers.

Let us take our difficulties one by one and examine them. The first is the subdivided plots of land. They say our agriculture is incapable of improvement owing to smallness of our landed holdings. In Denmark the average farm is 10 or 15 acres. There are many farmers quite comfortable on 5 or 6 acres even. But the Danish rule is to sell milk, eggs, pigs only—no farm produce. They use the land to grow food for the cows, chickens, and pigs—that's the Danish idea.

Besides these Danish farmers have schools of Farming. They go and take courses of study in how to make farms pay. Has any Indian farmer any opportunity to do this?

Moreover the Danish farmers co-operate to build their own dairies; so they sell their milk to themselves and make two profits. We are told that perhaps one secret of their success is that they do 94 per cent. of their work themselves.

Thus we come to the second of our difficulties. Our peasants are indolent. We talk more of middle class farmers. They employ field labourers with whom they have no actual working concern. Necessarily the hired men become slow and stupid worker, not worth their wages.

We have thus to find out ways by which the middle class people can work to produce more food. Culture of fruits is one. Constant hired labour may be dispensed with in growing fruits. Careful attention to the approved methods of intensive growing coupled with labour under direct supervision of the working but trained master may give products which would amply repay the labour.

This applies to production of fish, milk, egg, etc. on modern method of intensive culture. We can use every inch of our unproductive lands, every yard of our waste pond for this purpose and we dealt in our previous issues as to how we can do this.

We have to organise ourselves to do this. A nation-wide organisation requires two distinct branches—(1) the working branch and (2) the financing branch. The work of producing food should be done in the villages and we can best do it without coming in clash with existing beneficiaries on co-operative basis. Let us form into a co-operative association with a fixed subscription either in money or in kind. The earning members of the villages may be the paying members, the unemployed may form the working members. Let a list be made of all uncultivated land and shallow pond. From the subscriptions collected and accumulated and with help and guidance of the working members, attempt may be made to cultivate the land with such articles as would give produce of greatest food value, and cultivate fish in the pond after excavating it suitably. We detailed the scheme in a previous issue.

We come to the central financing side. This cannot but be part of nationwide organization. Here is a field of work for our economists.

Let a financial organisation be made in every college in the town, in every higher school where students may be made to understand co-operation under popular teachers. Every college student may be made to contribute 2 to 4 As. a month, every higher class school student can be made to contribute 1 anna monthly.

Our traders can be organised to contribute part of the *Ishwarbretti* or *Barwari* fund to the national organisation.

The whole fund will form as an insurance fund from which loan can be granted under certain conditions to village co-operations, opportunities can be offered to student members for employment, under certain qualifications and training, in village co-operative organisations for trainers and co-workers gradually giving them chances to establish themselves as farmers or village industries in an improved way their education may enable them to adopt.

Among the trading members the co-operative membership may be taken advantage of to establish any member in difficulty again on firm footing. The details should be worked out by our

economists and organisation should be effected on national basis in which every member should have individual interest.

The whole object of this organisation should be not procuring or amassing of wealth but production of national food without clashing with any existing interests but providing opportunities for our youngmen of the educated middle class to join in co-operative work with time-honoured labours of our fields and to contribute their cultivated knowledge to the hereditary experience of our masses.

Opportunities should also be given to improve our village industries on labour saving lines suitable for the conditions of our country with the knowledge and experience of Western development.

In this country if food can be made plentiful and cheap and every available land and water brought under educated superintendence, unemployment and insanitation will vanish from the land without any outside help, without depending upon Government contribution, already overburdened with law and order, without looking for thrown-out bones of Government and mercantile service or provisions in the already crammed professions.

We wait for a response for better days for the unemployed.



TOWARDS SOLVING UNEMPLOYMENT.

In order to present to our readers the different aspects of the unemployment problem we invited suggestions for solution from leaders of thought. In the following article Babu Nilananda Chatterjee, M.A., B.L., Hony. Secy., Bengal Humanitarian Association, Howrah, details a practical scheme for agricultural training and dairy farming for the consideration of our youngmen: These two occupations, if pursued in right earnest, will certainly go a long way to relieve unemployment amongst them. In order to make the scheme impressive the writer cites a typical example. In general, however, he emphasises the production and conservation of national wealth by utilising the hitherto untapped resources of the country by the children of the soil.

DUTY OF THE STATE & THE PEOPLE.

AFTER the great war the problem of unemployment has stared more or less almost all countries in the face. Independent nations have tried and have greatly succeeded in bringing the situation under control. Perhaps in India alone it is getting keener and keener every day. One thing may be stated at the outset, viz, that stray, unorganised individual efforts can do but little. Intense, organised and wide-spread measures are indispensably necessary and this can only be done by State aid and under State direction. The condition of Denmark fifty years ago was exactly similar to that of India, but now with the help of the splendid co-operative organisation and State experts and State control, it is by far the most happy and advanced little country on the face of the globe. It must also be pointed out at the same time that active co-operation of the people, unflinching zeal and labour and putting every shoulder to the task

—all these are necessary to make the efforts successful and lasting in effect.

AGRICULTURE AND MAN-POWER.

India is a country where agriculture is and will continue to be the main industry of the people; and its being subdivided into numerous small holdings, only a few acres in extent, makes it practically impossible to use machine-ploughs or some of the bigger plants used in the advanced countries of Europe and America. Still it has got pretty sufficient man-power and cattle-power and these if properly utilised will certainly give sufficient and fairly lucrative employment to the unemployed. A pernicious practice has grown up amongst certain classes of people who indulge in a sort of gambling in the sale and purchase of commodities (commonly known is *phatka*). They do not help the production and increase of national wealth but only cause the transfer of money from one pocket to another and the artificial raising of the price of such com-

modity by which not the producer but only certain middlemen are benefited.

INCREASE OF NATIONAL WEALTH.

What is urgently needed at the present moment is an increase of our national wealth by the conservation and improvement of our avenues of income. We must proceed in such a direction as will increase and improve the quantity and quality of our out-put, as will give employment to the unemployed, as will provide cheap and substantial food and raiment to the poor and needy. This should be the aim of every reformer and thinker who has the good of his country at heart. In fact towards this ideal all our great leaders have and still are trying to lead the country and our economic salvation depends more or less upon the degree of success which is attained in this matter.

If we could grow two blades of corn where there was only; if we could open up new avenues and improve the existing ones from the vast and varied natural resources of this country and utilise the same for the children of the soil, that would be doing something in the right direction. We had hitherto found that for want of State help and organisation our splendid resources were being exploited by foreigners for the benefit of other countries while we are starving. Our present aim should be to conserve and improve these resources by initiative and organisation amongst ourselves irrespective of State aid, and in the face of foreign competition and obstructive policy.

POSSIBLE SOURCES.

A little experience and a bit of thinking will convince one that our first

duty should be "improvement of agriculture." Latest statistics prove that the outturn of crops in our fields is hardly one-third of that of Japan, Denmark, Great Britain, Switzerland or even Egypt. Here we can by persistent efforts introduce improvement and intensive methods of cultivation. Better seeds, better tilling, better manuring, better organisation for water-supply and sale of products are sure to bring good results. Then horticulture is a practically neglected subject in India, and in fact we have to depend upon other countries for the supply of fruits. The growing of more fruits in extent and variety, the planting of kitchen vegetables and orchard trees are extremely desirable in the interests of the country. More wide and extensive preparation of date-sugar, palm-sugar and beet-sugar are urgent necessities. Sericulture, pisciculture, cattle-breeding poultry-farming, these are fruitful sources of income in many countries and I do not see why this should not be so in our country also. Small and inexpensive home-industries form another fruitful source of income. Spinning, weaving, tailoring, carpentry, smithy including manufacture of bolts and nuts etc., sticks, bats, preparation of safety matches, washing soaps, essential oils, manufacture of paper (handmade)—these and similar other small industries may give direct or subsidiary employment to a large class of persons.

"RUPNARAYAN CHURS."

With this preliminary introduction I proceed to draw the attention of the readers to the particular matter which

I have in view and which may be regarded as a step towards solving the problem of unemployment. Towards the latter half of 1924 I was informed by a high Government official that about 1000 acres of good chur land in one plot, on the bank of the Rupnarayan opposite Kola, in the district of Howrah were available on a nominal rent for any good and useful national work. The land belonged to Government and during the life time of Sir Asutosh Mukherjee it was proposed that it would be utilised for starting an Agricultural College by the University of Calcutta with model farms and cattle-breeding station attached to it. With the sudden death of Sir Asutosh, the dominating spirit of the of the University, this useful scheme came to the verge of falling through. It was at this juncture that I received the information. Sir. W. E. Greaves was then the Vice-Chancellor of the Calcutta University and also the President of the All-India Cow Conference Association Calcutta. The University had no money to spare and it sadly lacked in initiative. The splendid lands with its infinite possibilities of development ran the risk of being leased out to rack-renting landlords or scheming exploiters. A unique opportunity of doing some service to the country, of offering an opportunity of employment to the future generations was going away. What could be done? With the help of a few friends the Government revenue for the lands was raised and the amount was deposited on behalf of the All-India Cow Conference Association as sub-leasee of the Calcutta University. Negotiations having proceeded

some way with regard to the taking of lease of the lands for 99 years by the University, it was thought advisable to co-operate with the University in securing revenue for the land from other sources until the University had money to do the same and launch their scheme of agricultural education. The proposed scheme is under the active consideration of Special Committee consisting of Sir Nilratan Sarkar, G. C. Bose, Esq and others and I think it would not be divulging a secret to indicate here a bare outline of the same.

THE UNIVERSITY SCHEME.

It is under contemplation to utilise about a third part of the land for an Agricultural College with agricultural annexe. Another third is to be let out in plots of say 15 acres to bonafide students and local gentlemen interested in the improvement of agriculture, for carrying on agriculture on improved and up-to-date methods. The remaining third is to be used for the purposes of cattle-breeding and dairy farming. The first two branches will be under the direct control of the University and the third under the control of the Cow Conference Association. This is neither the time nor the place to give further details of the University scheme. It will be enough to state that this will give splendid opportunities to batches of unemployed youngmen to get themselves trained in introducing intensive methods of agriculture and tapping the hitherto untapped sources of national wealth.

COW CONFERENCE SCHEME.

Further details of the Cow Con-

ference Scheme is available and they are given below for what they are worth.

1. Aims and Objects.
 - (a) Keeping of dry cattle, Dairy farming, Cattle-shows etc.
 - (b) Keeping of stud bulls and carrying on experiments for improving the breed of cattle.
 - (c) Carrying on researches in fodder-growing and Pasture.
 - (d) Carrying on researches in Veterinary medicines and vegetable herbs.
 - (e) Inviting the co-operation of agricultural and other experts.
 - (f) Training of Apprentices.
 - (g) Levying of reasonable fees for cattle already grazing there.
 - (h) Sub-letting lands to agriculturists for raising of paddy, straw and for growing fodder crops.
 - (i) Sub-letting lands to persons for horticultural purposes.
 - (j) Sub-letting lands to persons and bodies for objects similar to the above.

The following Scheme was approved:-

Income.

	Rs.
From grazing fees	500|-
From Paddy lands	750|-
From Charges of 40 Cattle kept	500|-
	1,750|-

Expenses.

	Rs.
Govt. Revenue	750|-
Recurring Charges	1,000|-
	1,750|-

Capital Expenditure.

1 Shed for accommodating 40 Cattle (60" x 20" @ Rs. -|8|- per sq. ft.)	600|-
1 Shed for accommodating 40 calves (30" x 10" @ Rs. -|8|- per sq. ft.)	150|-
One bungalow for office and servants' quarters	500|-
	1,250|-

Details of Recurring Charges.

Pay of one whole time Darwan @ Rs. 20|-.	240|-
Pay of one Sarkar @ Rs. 20|- p.m.	240|-
Pay of 2 servants @ Rs. 15|-	360|-
Miscellaneous	160|-
	1,000|-

It is hoped that gentlemen and youngmen will interest themselves in the above matter and help the inauguration of a Scheme which will lead, however humbly, towards solving the question of present-day unemployment of our young *bhadralog* class.

THE WIDE-SPREAD UNEMPLOYMENT.

Of late unemployment in India has assumed gigantic proportions. The economic condition of the nation is acute: particularly the middle class people are in pecuniary distress. We make an endeavour in the following pages to study the problem from different view points and to find out a solution acceptable to all. We are of deliberate opinion that immediate relief can be assured only by the development of trade and industry in the country.

WHAT are the causes of, and remedies for, unemployment? This is the most difficult of social questions confronting leaders of current thought in India.

Unemployment is a social disease due to complex causes, which can only be adequately dealt with by a careful study of these causes and the application of a number of different remedies.

There has been a steady growth of the sense of public responsibility for the case of the unemployed. If this sense of responsibility is to issue in further action, it is before all things necessary that that case should be fully understood.

SOCIAL PROBLEM.

The problem of unemployment lies, in a very special sense, at the root of most other social problems. Society is built upon labour; it lays upon its members responsibilities which in the vast majority of cases can be met only from the reward of labour. The problem of unemployment is therefore the problem of the adjustment of the supply of labour and the demand for labour.

We must realise that idleness of an important class of society is a matter which concerns not only those immediately affected, but the whole nation. It

means loss of wealth, physical and moral deterioration, growing discontent among the working classes, and a condition of unstable equilibrium that is a menace to the State. Continuity of employment is thus the indispensable basis of social and economic welfare.

Strange as it may seem, although unemployment occupies so large a share of public attention, we have very little idea of its actual extent. This is, in the first instance, because it is so difficult to define it.

Looking from another point of view much of the human wastes can be avoided if it is realised that there is no person alive whether competent or incompetent, who is not more useful to society employed than unemployed.

EMPLOYMENT.

All employment is created only by production followed by purchase. All deficit in employment is created by non-production, whether active or idle, followed by an artificially granted purchasing power. But it is plain that, even in an ideal community it is not even the producers who create employment for others by their productive acts alone. Such acts might feed the actors themselves, although only meagrely in com-

parison with modern standards. But in a modern society with its complex tools and enforced specialisation, it is only an equitable interchange of equivalent values promoted solely by desire for consumption, which affords employment and forms the true cement of social and economic solidarity.

CAPITAL AND LABOUR.

The field of employment which any place offers for labour and capital depends first on its natural resources; secondly on the power of turning them to good account, derived from its progress in knowledge and in social and industrial organization; and thirdly, on the access that it has to markets in which it can sell those things of which it has superfluity.

PRODUCTION.

Employment depends upon the members of the community being willing to exchange freely their service, or the product of their service, for part of the product of the service of others. If all would be willing to sell their service freely, all would be freely employed. Their common policy would generate such an effective demand that not only would all be employed, but the total production would be increased enormously.

UNEMPLOYMENT.

The first measure of the economic perfection of a nation is the degree to which each coin of the realm buys its full value in the open market. But only second to that, as a measure of the civilisation built thereon, is the certainty, continuity and justice with which that nation awards or permits employment.

The right to regular employment is one of the basic rights of man. It is so because activity is as normal as essential to the pursuit of life and happiness as is food, rest or legal justice.

Paradoxical though it may appear under serfdom, slavery, feudalism or any other politically oppressive system of the past, which repressed labour by tying it to a given locality, there has never been any complaint of unemployment.

In the history of human evolution it was only as the peasant became freed from the soil that he became the slave of unemployment. With the relatively novel license of every man to roam the land in search of the task which pleased him best, came simultaneously the irresponsibility of the employers for the engagement of all who might present themselves for work.

Later on, as opportunity developed, this same liberty of choice has led labour, in increasing numbers, to the selection of the more lucrative occupations of commercialism, in preference over the more poorly paid productive ones; and this results in a further general deficit in demand for work on the part of the employers.

MACHINERY AND OVERPRODUCTION.

The popular explanation of unemployment traces it to machinery and overproduction.

Machinery—and the word is used in its largest and most comprehensive sense—has been most potent in bringing the mechanically producing nations of the world to their present industrial position, which position constitutes an epoch in their industrial development.

The rapid development and adaptation of machinery in all the activities belonging to production and transportation have brought what is commonly called overproduction; so that machinery and overproduction are two causes so closely allied that it is difficult to discuss the one without taking the other into consideration. The direct results, so far as the present period is concerned, of this wonderful and rapid extension of power machinery are for the countries involved, overproduction, or, to be more correct bad or injudicious production.

CAUSES.

There is no general want of adjustment between the natural increase of the people and the expansion of industry, between the rate of supply of fresh labour and the normal growth of the demand for it. There are specific imperfections of adjustment which are the economic causes of unemployment.

One of these has long been recognised. While industry, as a whole, grows, specific trades may decay, or change in methods and organisation. A second type of maladjustment between the demand for and the supply of labour is found in actual fluctuations of industrial activity. These two elements in the problem of unemployment have long been familiar. A third, apparently far more important than either the occasional transformations of industrial structure or the periodic fluctuations of industrial activity, is only just beginning to receive attention. This is the requirement in each trade of reserves of labour to meet the fluctuation of work incidental even to years of prosperity.

INDUSTRIALISM.

Changes of industrial structure are constantly occurring and constantly throwing men out of employment. The very life and growth of industry consist in the replacement of old machines by new; of established processes by better ones; of labour in one form and combination by labour in fresh forms or fresh combinations. The demand for labour is thus in a state of perpetual flux and reconstruction both as to quality and as to quantity.

Certain forms of unemployment are inherent in the industrial system. Whatever the organisation of society there would be fluctuations in foreign trade due to circumstances over which the Government could have no control and a falling off in the demand for a commodity, whether due to changes in fashion, or any other cause, would involve a reduction on the amount of employment. But one important cause of unemployment is the direct result of the existing competitive system.

The industrial problems of the present day, the problems of years past, are closely connected with the use which we make of our youngmen: the chances we give them to advance and by advancing, to assist others by services and example: the avoidance of putting them in wrong places; their opportunity of getting a fair chance according to their efforts and brains, and of understanding the position of others and not seeking or imagining understanding.

REMEDIES TRIED IN THE WEST.

Various attempts have been made in the West to cope with the problem of the

unemployed, but the remedies were at best palliatives. Municipalities have opened relief works, charitable funds have been raised, the aid of the law has been invoked, legislations have been enacted—but none of these things represents anything more than an attempt to relieve the distress arising from unemployment—and even this is effected very inadequately. The root causes of unemployment itself are left unaffected. Much was expected from Labour Exchanges as a means of organising the labour market and introducing order into the present industrial anarchy, but their activities needed to be supplemented by other agencies. At one time it was suggested that the Government could do a great deal to regularise the aggregate demand for labour over a long period by a more deliberate arrangement of its orders for work of a capital nature. The important point in connection with the proposal is that it does not contemplate anything in the nature of relief works, which are sometimes demoralising and always expensive. There would be no employment of the unemployed as such; the work would be done in the ordinary way, but the labour market would be steadied by reserving public work as much as possible for the lean years of employment.

OTHER REMEDIAL MEASURES.

For unemployment or under employment all economists are agreed that the only radical remedy is an expansion of trade.

The symptoms may be alleviated by schemes of relief, of Government employment and the like, but such schemes must be financed out of the pockets of

the tax payer; in other words by a further charge upon industry; and though expediency may compel the application of such remedies, they are only too apt to accentuate the root causes of the disease whose symptoms they are designed to relieve. A genuine demand for labour, emanating from industry, can alone provide a permanent remedy for unemployment. There may indeed be a demand for commodities of various kinds, but the demand can be met only if there is sufficiency of capital to set labour on the tasks appropriate to the supply of those commodities.

WAYS OF GETTING A LIVING.

The study of man's efforts to get a living may well be considered one of the most serious and important topics which can possibly engage the attention of the student of economics. It is a rather commonplace observation that the race must get its living out of the material world which surrounds it; that is, its living must ultimately come out of the soil and the water. But when we consider man as an individual rather than as a race, we find that he sometimes makes his living directly out of other individuals.

The first and fundamental distinction to be made among different ways of getting a living is that between the uneconomic or unproductive methods and the economic or productive methods. The uneconomic methods of getting a living are sometimes destructive and include all those occupations in which one's success depends upon one's power to destroy, to injure, or to deceive: war, plunder, robbery and fraud of all kinds

are included in this class. These methods are called "uneconomic," because when one individual secures something by any of these methods no one else is benefited and some one is sure to be injured. Other methods are not positively destructive, but are nevertheless unproductive in the sense of returning to society no real advantage for the living received. Getting rich by marrying or inheriting wealth, or through a rise in land values, would come in the class. The economic or productive methods of getting a living are those in which one's success depends upon one's power to produce or to serve. All productive industries and all useful trades and professions belong to this class. They are called economic because, when one individual gets something by any of these methods, no one else is injured and some one is always certain to be benefited. People who make their living by these methods do not impoverish other people, but tend to enrich them. The richer a man gets by any of the productive methods the richer he makes the rest of the world, and in proportion as the whole community or the whole world adopts these methods, in that proportion will the whole community or the whole world prosper, whereas the opposite is true of the uneconomic methods. Productive labour is best defined as labour which creates or develops directly or indirectly, material or immaterial products, or changeable, and possessing a value not less than the value consumed in producing them.

SOURCES OF INCOME.

In all modern societies the two chief sources of income are the performance

of work and the ownership of property. Within the category of work we may, for certain purposes, draw various broad distinctions, as, for examples, between comparatively skilled and comparatively unskilled work, or between brain work and manual work, or between those who work on their own account such as doctors, lawyers, artists and employers of labour, and those who work under the supervision of another. It is possible, however, to reach certain general conclusions concerning the aggregate income from work, without taking account of the great differences which exist both in the nature of various kinds of work and in the amount of income obtainable in various occupations. The economic ways of getting a living may be divided into three principal classes, called primary industries, secondary industries, and personal and professional service. The primary industries, sometimes called extractive industries, are those which are engaged in extracting useful material from the earth, the soil, or the water. They are farming, stock raising, fishing, hunting, lumbering and mining. The secondary industries are those which handle and make over the materials furnished by the primary industries and bring them to a place where they can be used, or change them into a form which is more desirable, or store them till a time when they are needed. They are transporting, manufacturing, and merchandising. Personal and professional services are all services which though of the highest utility, are not engaged directly in producing or handling material commodities. The teacher, the physician,

the lawyer, the engineer, and a great many others are performing services of this class.

In our investigation of unemployment we must take into account that huge, but secondary, burden of unemployment the enforced idleness of lands, materials and appliances.

TECHNICAL EDUCATION.

It is generally admitted that higher literary education in India has been overdone, the result being the production of a large number of educated men who cannot find employment commensurate with their qualifications. In the same way technical education may prove a curse instead of a blessing, if it turns out a number of men who cannot obtain employment, either owing to the inefficiency of the education, or to the fact that it has been conducted on wrong lines, or because suitable and remunerative employment does not yet exist.

If it is admitted that in every other country technical education has followed the organisation of industries, or grown up alongside with them and may be said to be the necessary complement to industrial efficiency, it is obvious that in a country where few industries are established, the wholesale education of our youngmen could only result in an excess of youngmen trained up for posts which do not exist, and for whom no suitable occupation can be found.

Technical education to be serviceable should conform to the following requisites. It must be (1) essentially practical and covering as wide a ground as possible, (2) of such a character that it is capable of being applied commercially;

(3) the theoretical portion should be complete enough to enable the student to reason for himself in a difficulty and to act on his own initiative in case of emergency; (4) the working conditions should be so exacting that the transition from educational to practical life is not so great as to cause a desire to slack work.

The unemployment problem in this country has become most acute in Bengal and amongst middle classes. The Government, therefore, appointed a committee to probe into the causes of and to suggest remedies for unemployment. The Report of the committee has been recently published. We make no apology for extracting some of its salient features.

After dilating on the causes of middle-class unemployment in Bengal Rev. A. Gill explains how the problem has been solved in Belgium.

MIDDLE CLASS UNEMPLOYMENT.

The cause of unemployment among the middle classes is well-known; the rush of semi-educated men from villages to the town, and the slump in trade which produces a surplus. A number of supernumeraries have recently returned to their villages. This movement should be encouraged but with doubtful success as village life is not attractive. Only the middle classes could make it more attractive by settling in villages and a little propaganda would persuade a number of Bengalee unemployed to take to the fields again and be absorbed into their joint families. It is the secret of the unemployment solution in Belgium where the surplus labour can always fall

back on their fields. This produces balance and stability; and the remedy is quite consonant to Indian life as it prevails among lower classes of labour. As education is partly responsible for the townward suction education must be made the instrument of the reversion movement.

In this connection the colony plan, which according to Capt. Petavel has been successfully worked in Switzerland is worthy of notice.

COLONY PLAN.

In Switzerland a most interesting direct attack has been made on unemployment that shows us the immense strength of the colony plan. In that country well-equipped and organised labour colonies have been established where the worst class of the unemployed are helped to produce things for their own use and consumption, and are self-supporting. In an organisation of this kind the Swiss make even the people generally classed as unemployables, vagrants sentenced as such by the courts not only earn maintenance for themselves but earn enough to have a small sum to their credit after a year or two. These Swiss colonies prove that under modern conditions, when people cannot obtain work for wages, they can be employed producing things for themselves such organisation could, if permitted, do a great barter trade with their exchange cheques.

WORKING OF COLONY PLAN.

A well-equipped colony can do more than merely employ people. Those working on the "Colony Plan," producing things for their own consumption, are

earning both the producers and the distributor's wage. The colony can enable people who are willing, for a time, to forego money payment, and accept remuneration in kind, not only to tide over a period of unemployment, but to accumulate a little fund which will help them to make a fresh start in the outer world.

It is this that render the colony a real, and practical solution, both from the human and the economic points of view, and that would make the colony the stepping stone.

Though the colony plan offers a complete solution, the difficulty is that, to apply it generally, is not quite simple. It raises many questions and there are rival schemes, and the problem of unemployment like all other social problems, remains unsolved finally because we cannot agree on any one of the many plans put forward for its solution.

But a great hope for the colony plan arises from the fact that it is by means of colonies of this kind for the young and only by their means, that we can solve our education problems and particularly the problem of the sort of education that is required to bring the rising generation to be practical and resourceful and capable of cutting out careers for themselves.

EDUCATIONAL COLONY.

Capt. J. W. Petavel is emphatic in the advocacy of the educational colony which he outlines in the following passage.

In the educational colony the work, first and foremost of cultivating the land, then of building houses, doing repair

work, making furniture, clothes, tanning hides, and making leather goods, and some other industries would be carried out on a sufficiently large scale for each kind of worker to have an appropriate task; for educated people, that is to say, who have not been brought up to heavy manual labour to do machine and "process work," and the lighter work connected with agriculture whilst people of the working classes either hired labourers, or lads or men who would come to the colony for technical training would do the heavier work.

According to the different dispositions of different individuals, some would take a little money as soon as it was due to them, go away and make an attempt to set themselves up in the world, or to find congenial employment, and if they failed, come back when their money was gone, and start fresh in that way, even the least hopeful would have every chance of reaching the goal of some small ambition--others would use their opportunities patiently and systematically to attain to greater things.

In the opinion of Capt. Patevel, unemployment is the result of modern labour-saving machinery and methods of organisation, which enable one man to do in a couple of hours the work that used to take a whole day in the past, and thus enable one man to do the job that used to employ four men. The obvious remedy is to employ the people thrown out of work producing the necessities of life for themselves, helped by these labour-saving methods, so that they would be able to do the work in a fraction of the day, and spend the

remainder of it working also in an organised way, equipping some industry for themselves by their combined and organised labour, so that by and by they would be set up as members of a community properly constituted to produce necessities of life for itself.

The nature of the vocational training to be pursued in this country has been aptly put by Rev. Gill in the following words.

VOCATIONAL TRAINING.

Vocational training should be so directed as to create the small industry in the country without attracting the population into town. The old artistic industries of which the small artisan can always keep the monopoly, should be given due preference, because no machinery will ever emulate the human hand in certain handicrafts like lace-making, artistic pottery, weaving, silks muslins, etc. This will keep the population to the country and provide it at the same time with the sustenance agriculture is inadequate to give.

RECOMMENDATIONS OF UNEMPLOYMENT COMMITTEE.

The following are the recommendations of the Unemployment Committee regarding the Economic Development of the country which is of particular interest to us:—

(a) intensive progress in the direction of the recommendations of the Indian Industrial Commission be made.

(b) as the economic development of the country depends on the application of the tested results of research the development departments of Governments should be strengthened and every en-

couragement given to research and demonstrations.

(c) capital in large amounts should be invested in agriculture, irrigation and in communications.

(d) the work of the development departments should be co-ordinated through an expert standing committee of the heads of these departments.

(e) experiments be carried out to determine whether agriculture can be made a profitable occupation for (Bengali Bhadraklok) middle-class people.

(f) similar experiments be carried out regarding, cattle-breeding, dairy-farming, poultry-farming, etc.

(g) a class of properly trained development agents be appointed to carry on intensive propaganda of the results of research in the mufasil.

(h) the co-operative society movement be greatly encouraged in the directions other than the supply of cheap credit only.

A PRACTICABLE SCHEME.

The first step towards the solution of the unemployment problem which we are offering is self-help. The unemployed shall have to select careers suiting their proclivities and search out work for themselves. For their guidance we will simply throw out some hints which will show them the way.

At the outset we maintain that opportunities are always present; that with proper equipment, training and enterprise no one need be without employment. And in the following pages we will endeavour to chalk out a few avenues of employment for the unemployed middle classes.

The first and foremost field for employment at the present moment is that of agriculture, the advancement of which on modern lines is a crying need. With the growth of population the demand for food-stuff will increase. Not only therefore will the production of staple food be profitable but also of animal food. Afforestation is another method of dealing with unemployment. It is a work of vital importance to this country, the neglect of which will be greatly injurious to posterity. Again India is a large exporter of raw materials in the treatment of which there are opportunities for earning money.

In the industrial field there are always opportunities for starting some small industries and a few big industries. Persons with determination, grit, enterprise, common sense can avail themselves of the opportunities. In this country specially a number of educated youngmen can easily find employment in the revival of cottage handicrafts, in the adaptation of mechanical appliances, in the substitution of antiquated methods.

Even where the starting of altogether new industries is neither feasible nor practicable, some side lines can be taken up as adjuncts to existing ones, e.g., in repairing and renovating and the like.

Then there is also scope for organising certain industries and stimulating others. Some needs over-hauling, others additions. Introduce up-to-date methods in certain industries and eliminate wasteful processes in others.

Again, inspite of adverse circumstances education is spreading; the wants

of the people are becoming diversified: the standard of living is being steadily raised. The lesson to be derived from these facts are that considerable profits will accrue by engaging in new business or by expanding old ones.

The requirements of the vast population of India are many and varied. Study their requirements, study the needs of your locality, study the market, bestow your attention to the surrounding circumstances and observe silently the field of industry and trade and you will learn many things.

AGRICULTURE.

In any scheme for the improvement of Indian agriculture which is in a sorry plight as a result of neglect there lies a vast potential field for employment. The fallow lands must be reclaimed and the arid tracts must be irrigated. Cultivation must be conducted on improved methods. Mechanical implements and new crops must be introduced such as hop, camphor and the like possessing economic utility. Both intensive and extensive cultivation must be undertaken of the staple foods. Floriculture and orcharding, especially near growing and populous cities, will be found lucrative. The possibilities of drugs and dyestuffs must be explored. The cultivation of sugar cane can be greatly extended while sugar beet can be introduced. Sericulture can still provide for a large number of people.

The industries allied to agriculture are also numerous and have been scarcely attempted. The drying of vegetables, drugs, herbs, etc., and conserving of fruits, green and ripe, come first to mind. Canning and condiment preparations are

adjuncts to the above. The carriage of preserved foods from one part of India to other parts is fraught with many possibilities.

Animal husbandry, though at first distasteful to some Indians, will open a long vista of employment. To start with dairying and cattle breeding is a desideratum in this country. By supplying milk and ghee to the cities and furnishing good breeds of cows and bulls to the country side, hundreds of our countrymen can earn more than their livelihood. The cultivation of fishes in the reclaimed ponds in country side will engage many more. There is a dearth of good live fish in the market. Goat and poultry rearing also offers immense scope. The trade in egg and its various products is considerable. The rearing of sheep, for its wool and mutton, has not yet been attempted on a large scale. Apiculture and aviculture are particularly suited to romantic tastes.

As side lines to the above we may point out pasteurization of milk; preparation of starch; extraction of fibres (from banana, agave, etc.); manufacture of agricultural manures, etc., etc.

The unlimited scope for the employment of talent and enterprise in the agricultural field alone will be evident from the above.

India with her long sea-coast has little to boast of sea-fishery. Here is a new departure from the stereo-typed walks of life particularly congenial to persons of adventurous disposition. Apart from the fishes intended for consumption many useful substances such as

fish oil, fish meal, isinglass, etc., can be extracted from them.

In a word in the growing and distribution of food-stuff to the teeming millions of India there is unlimited scope.

FOREST.

Afforestation is a new line which must be inaugurated in this country, otherwise our valuable forests will be depleted in no time by wreckless deforestation. We can grow timbers say suitable for matches and pencils and the like. Malarious tracts can be made healthy by growing eucalyptus. The turpentine and rosin industry has made a headway in some parts of Upper India. In forestry there is the scope for lumbering on a vast scale. timbers may be supplied for railway sleepers, for fuel, or distillation and charcoal, for industrial products like acetone etc. Forest products can be collected and utilised such as silk, lac, resin, myrobalam etc.

MINES.

The mineral wealth of India is not yet fully known. Besides coal, mica, oil, gold, diamonds, etc., which are comparatively well-known reports are often heard of new discoveries, say of garnets in Central India, gem stones in Kashmir and so on. New and valuable ores are often found which must be thoroughly examined and extracted. The manufacture of carbon black is a suitable line along with mineral oil industry.

The animal products of India can be utilised in many respects; by selling musk and fur, fertilisers and trinkets from bones, etc., manufacturing glue and gelatine from other refuse, treatment of

guts for sporting goods and musical instruments, making animal charcoal.

INDUSTRY.

In talking of industry it will be advantageous for us to adopt two broad divisions: (1) small industries and (2) large industries

Quite a lot of small industries can be built up either by themselves or as adjuncts to bigger industries. We will enumerate a few articles, the manufacture of which will be found profitable: crayons, egg-pulp and powder: infant and invalid foods, mantles, guts, hosiery, tobacco-pipe, watch oil, cycle oil, lubricants, insecticides, disinfectants and antiseptics, stationery goods, etc., etc. To indicate how new small industries can be started we may cite the following instances. The use of aluminium utensils for domestic purposes is increasing by leaps and bounds. Along with it the necessity for their repair and cleaning is growing. It follows therefore that aluminium solders and cleansers will have good sale. In this way opportunities must be sought by studying the market.

The following large scale industries are more or less established: Iron and steel: lime and cement: paint and varnish: chemicals, heavy and fine: soap and glycerine; glue and gelatine; glass, enamel, papers, sugar, textile, leather, pottery, match, pencil, biscuit, cinema, mineral and vegetable oils, oil cloth, waterproof and fire-proof fabrics; tanning, textile, etc. Many are the subsidiary industries that can be built up along with these or their products; such as manufacture of leather and rubber goods.

If the possibilities of the following industries be explored with a view to establish them an outlet can be found for new talents. We refer to the manufacture of explosives, celluloid, artificial dyes, pin, watches and clocks, cycles, cameras, motor cars and trucks, lamps, hurricanes, electrical bulbs and goods, fountain pens, gramophones and the like: sewing machine, sanitary wares: and the like.

The importation of agricultural and industrial machineries as well as their manufacture or at least some suitable parts is profit yielding.

We need not mention file, brush, comb, button, etc. which have been more or less successfully attempted.

MECHANICAL.

We give a list of some of the mechanical industries which may be started; Ice-making for supplying ice to the interior parts in the hot season; refrigeration for cold storage of food-stuffs in cities and ports; sinking wells and fitting pumps for water supply; grain elevators for agricultural districts, oxyacetylene plants for welding iron and vulcanisation plants for mending rubber tyres etc.; artificial stone, tiles, etc.; iron and brass foundry, moulding work, fully equipped machine shop with lathes, tools, drilling and milling tools; wood-working machines, sheet-metal working machines and the like.

Rice mill, flour mill, oil mill, sugar mill, cotton mill, ginning, baling etc., have capacity for still more. With the spread of education the need for printing presses will grow. The same remarks applies equally to litho presses.

Particularly there is scope for artistic printing, say, for catalogues, calenders, pictures, labels, etc. Photogravure process has not yet been attempted though it is a simple and profitable industry. Type-foundry for making types of the various vernaculars of this country will provide ample work. Equally is the case with mercerisation, calicoprinting, shawl weaving and other textile industries.

CHEMICAL.

In the line of chemical industries there is the growing demand for industrial alcohol which may be obtained from otherwise waste stuffs, e.g., mahua which grows in abundance; distillation of essential oils from lemon grass, eucalyptus; manufacture of alkali products from salt and reh deposits: manufacture of organic acids from citrus fruits like lime and tamarind, extracts and tinctures of drugs; pharmaceutical preparations, manufacture of starch and dextrin: of artificial butter from vegetable sources e.g., illipi nuts; of candle, glycerine etc. as a side line to soap industry. A very useful industry is the purification and filtration of water in the countryside thereby improving the condition of the villages. The preparation of vegetable dyes and flavouring essences is also profitable.

We will indicate some of the new industries that can be started. Uptodate steam and electric laundries offer large scope; as well as making of envelopes and paper bags. Others of this kind are barrel-making, case-nailing, bottle-washing, filling and labelling.

The existing industries that can be modernised are bread and cake making

by introducing baking ovens; adaptation of the glass bangle industry of U.P. to meet the requirements of Bengal; classification and identification of orchids growing in the hills. In the treatment of raw materials beeswax bleached, tannin extracted from tanstuff and the like.

As altogether new but simple industries we may point out that a profitable industry can be built up by bottling natural spring water running waste in many parts of India, but known and proved to be efficacious against certain maladies. The manufacture of papain from papaw is another case in point. It is a good substitute for animal pepsin but imbued with similar properties. With the growth of the hosiery industries there is scope for mercerising cotton yarns, etc. The preparation of foods for invalids and infants such as barley, arrow-root, malted milk, etc. is lucrative.

CAREERS.

The public are convinced by this time of the great utility of reviving the spinning and weaving industries which will furnish occupation to millions including women and children.

The necessities for trade naturally increase with growth of industries. There is at the present time room for expert salesmen, canvassers, travelling salesmen, commercial travellers, business organisers, advertising agents, advertisement writers, commercial artists, laboratory assistants, chemists and analysts, research students, factory managers, supervisors, foremen, tindals for handling agricultural and industrial machinery; and the like.

The room for professional service is ever widening. In the engineering line there is extension and opening of new railways; vast irrigation and harbour schemes; hydro-electric installations; electric lighting and traction requiring electrical engineers; tramways and airways; wireless telephones and telegraphs. Then with the expansion of trade and business the facilities for transport and communication must be provided for which means work.

TRADE.

To indicate the room for expansion in the business field we may point out that there is scope in internal trade, local and provincial, import and export; in food-stuff and clothes; in necessities and luxuries; in bringing out raw materials from the interior and reaching finished goods there; in the production and distillation; in wholesaling and retailing; in mail order business. Indians with high aspirations may launch into international commerce with vigour; in finding a market for our wonderful art-wares in the cities of the West; in carrying on trade with Indians outside India, say with Kenya, supplying all their necessities; in snatching a large share of the trade in Far and Near East, e.g., Mesopotamia, Arabia, China, Strait Settlements; in carrying trade with countries across the frontier, say, with Afganistan, Central Asia, Persia, etc. Centrally situated as we are we must have a large share in this enormous trade.

CONCLUSION.

The inauguration of new industries and the expansion of existing trades which we hold forward for public con-

sideration as the immediate solution of unemployment among middle classes can be effected only through organisation and co-operation.

The useful cottage industries scattered throughout the country can be revived to increase their output; the labourers can be organised to attain more efficiency. The principles of co-operation will find practical application in financing those industries, in granting credit and banking facilities to the artisans and workers. It will also facilitate the purchase of the raw materials and the sale of the finished products.

Many and varied are the natural resources which are waiting to be exploited: in the animal kingdom, in the vegetable kingdom and in the mineral kingdom. These can be easily converted into useful articles. Then there are many byproducts which are hitherto running to waste but can be utilised with profit. A careful scrutiny of the processes of industry and the methods of trade pursued and adopted in this country will reveal that most of them are either antiquated or wasteful. These can be so modified as to make them remunerative.

IDEAS FOR THE UNEMPLOYED.

We append a collection of typical ideas which can be worked by the unemployed with profit. The list is by no means exhaustive and similar other suggestions may be easily added.

LEASE OF FOREST.

A man with a capital of 2 to 5 hundred rupees in his pocket can earn his livelihood by adopting the following.
He should obtain on contract for Rs. 200 for a year or so, a piece of

forest containing wood, produce of grass etc. He can earn money (1) by sale of wood (2) by sale of charcoal, which could be turned out by himself (3) by sale of grass in winter season (4) by sale of smoking leaves (5) by sale of gum acacia.

Besides this he has grass where he can allow cattle to graze upon at reasonable rates, during the winter season. Finally there is honey for him which he could collect and offer in the market.

DRY PLANTAIN.

Small capitalists who live in places where the cultivation of plantains is very large, cheap and best can engage in dry plantain industry with profit. The drying operation is generally an Indian one; no foreign machinery for the process is required. A few cane mats are spread over an erected platform. The plantains are strewn over the mats and a fire is lighted below. This drying method is economical.

FEATHER BRUSHES.

There appears to be a fairly good demand for feather brushes. They are very fine to look and very easy to manufacture. Foreign made feather brushes fetch a good deal. Like other brushes a feather brush consists of two part (1) a wooden handle (2) feathers fastened to it by means of fine cords. The method of making such a brush is very easy.

BUTTONS FROM WASTE PAPER.

Waste paper is first treated as in the preparation of papier mache. It is then pressed and rolled out. Buttons of required size and shape are then punched

out from the sheets. Hooks are attached with pliers and wire.

ALLIGATOR SKIN.

The industrial demand for the skin of the alligator is of enormous magnitude in foreign countries. It is strange that people in India never thought of hunting crocodile in which business and pleasure might be blended in well-balanced proportions. Skins of these reptiles may be of various commercial use being excellent for lady's hand-bags and other fancy article. It does not require much capital to invest. Similarly trade on hogs and pigs and their bristles are of much profitable concern.

CULTURE OF FROGS

Trade in frogs is a most lucrative business with a small capital. In the western countries frog is a much relished food. In Bengal there is no want of these shallow ponds and frogs live mainly on insects and flies. But frogs of the non-poisonous types must be cultured.

UTILISING MANGO STONES.

Mango stones can be utilised in the manufacture of starch, blue colour, gallic acid etc. The mango stones are collected, shelled and the kernels preserved.

(1) For the preparation of starch the kernels are mashed and stirred in water. The water is allowed to settle when a thick sediment of starch will be found.

(2) The kernels are crushed and soaked in water contained in earthen pots for a week. After a week decant the liquid and dry on heat in some tinned copper vessel. The concentrated liquid will yield fine white needle like crystals of gallic acid on cooling.

(3) The kernels are pounded to fine powder in an iron mortar with a pestle of iron; sift and stir the powder in water in a kettle with an iron rod. Add to this solution some iron filings and place in the sun when the water is evaporated a blue colour well be left.

SELLING CURIOS.

Europeans, Americans and Foreigners are fond of our Indian novelties. They want the fanciful and wonderful artwares such as, carved ivory and sandal wood, lacquered toys, papier mache articles, gold and silver works; and the like.

DECORATED EGG SHELL.

Rejected eggshells can be decorated and kept on the tables. The contents must be brought out through a pin hole. The inside should be cleaned with methylated spirit, and then with water. When the egg is completely dry fill it up with fine sand. Now draw some good design on the egg with the colour and also write any mottos. Then they can be set on a small wooden stool painted in any colour.

EGG TRADE.

Perhaps it is not known to the public that poultry keeping is carried on a very extensive scale throughout the districts of Chittagong, Noakhali and Tipperah. Large quantities of eggs are exported from different centres of this division. The method of packing and storage, as followed by the middle men at present leaves much room for improvement. They should be properly washed, scientifically preserved and packed in wooden boxes with cardboard partitions.

BRICK, TILE AND LIME INDUSTRY.

Out of the three important building materials, brick and lime are the most important and the demand for the same is increasing in every town. The industry in them is a paying one. Ordinary clay for bricks and lime stone for lime are the raw materials required and the fuel used can be wood or dust coal.

In the primary stage there is no necessity of a permanent brick but the sun-dried bricks are piled up vertically. The outside of the kiln is mud plastered.

Hydraulic lime is produced by burning lime stone. Lime kilns are round or oblong. Generally cinder is used for fuel.

ARTISTIC GLASS SIGNS.

Profitable occupation can be found by writing ornamental signs and mottos on glass plates. The point of importance is what should be written to sell them at sight. Religious verses from the sacred books; vernacular quotations inculcating good moral lessons; proverbs and precepts, mottos, etc. Small but beautiful sign boards can also be written for the shopkeepers who would like them very much.

DIRECTORY OF REFERENCE.**Aerated Water.**

S. Twitchell Company, 221, Vine St., Philadelphia, Pa, U. S. A.

Alcohol Distillation Plant.

Maschinenbau Akt Ges, Golzern Grimma, Germany.

Arc Welding Apparatus.

Geffi Gesellschaft, Fur Electrotechnisch, Industries m. b. H. Berlin S O 36, Germany.

Artesian Well.

Alexander Mouski, Eilenburg-A-bei-Leipzig, Germany.

Baking Ovens & Machines.

Mairich A. G. Berlin Weissensee, Germany.

Barrel Making Machine.

Anthon & Sohne, Flensburg 13, Germany.

Biscuit Machinery.

Pembroke D. Harton Co., Inc., Philadelphia, Pa, U. S. A.

Gierner & Sohn, Hamburg.

Bottling Plant.

Union Werke, A. G. Mannheim.

Bottle Washing Machinery.

The 20th Century Machinery Co., 396-98, Greenbush St., Milwaukee, Wis, U. S. A.

Farrow & Jackson Ltd, 16, Great Tower St., London, E. C. 3.

Brick & Tile Machinery.

Th Groke Akt-Ges, Mersburg, Germany.

Richard Raupach, Gorlitz 26, Germany.

Candle Moulding Machine.

Peter Koch, Modellwerk, G m b. H. Kolu Nippes, Germany.

Reinhold Wuntchmann, Leipzig-Lindenau, Joseph Str 31, Germany.

Can Making Machinery.

F. W. Bliss Co., 9, Pocock St., London, E1.

Carbonic Acid Plant.

G A Schutz, Wurzen in Sachsen, Germany

Case Nailing Machine.

Bohm & Kruse Maschinen Fabrik, Hemelingen 25 bei Bremen, Germany.

Casting Moulds.

A. Schmeidt & Sohn, Aubing Bay, Germany.

Cement Articles.

Zema Spezial Maschinen Fabrick, Cottbus Strobitz, Germany.

Cigarette Machine.

United Cigarette Machine Co., G. m. b. H. Dresden, A 21-II, Germany.

Cinematograph Apparatus.

Capital Merchandise Co., 534 S. Dearborn St., Chicago, Ill U S A

Johannes Nitzsche A G Leipzig Karlstrasse, Germany.

Concrete Machine.

Dr Gaspary & Co., Markraustadt near Leipzig.

Cream Separator.

Teutonia G. m. b. H., Frankfurt a Oder 5, Germany.

Dextrine Factory Installation.

W. H. Upland G. m. b. H., Leipzig.

Distilling Plants.

Maschinenfabrik Grevenbroich Grevenbroich-Niederrhein.

R. Ilges, Kolu-Bayenthal 84, Germany.

Domestic Utensils.

Alexanderwerk, A. von der Nahmer A.G. Remscheid-Berlin S. 14, Germany.

Drilling Machine.

Gebr. Reinhold, Gera Lusan 8

Drying Plants.

Trocknungs Anlagen Gesellschaft, m. b. H.
Berlin W 9. Kothener Str. 38.

Extraction Plants.

Otto Wilhelm, Stralsund, Germany.

Feed Mill.

A. M. Dellinger, Lancaster, Pa.

Fibre Extracting Machinery.

Ernest Lehmann, Manchester, England.

File Making Machinery.

The Hess Machine Works, Philadelphia, Pa.
U. S. A.

Flour Mills.

T. W. Schule & Co., Hamburg 1, Spitaler-
strasse 16.

Foundry Equipment & Supplies.

J. W. Paxson Co., Philadelphia, Pa, U. S. A.
Badische Maschinenfabrik, Durlach, Ger-
many.

Fruit Slicer.

John Harper & Co., Ltd., Albion Works,
Willen Hall.

Glazier's Diamonds.

Bush & Chipper, 47, Percival St, London,
E. C.

Grinding Mills.

The A. W. Straub Co., 38th & Filbert St.,
Philadelphia, U. S. A.

Thiem & Towe Maschinenfabrik, Halle
Saale, 132, Germany.

Hide and Leather Machinery.

G. W. Baker Machine Co., Wilmington,
Del. U. S. A.

Hydraulic Machinery.

Robert Middleton & Co., Sheepscar Foun-
dry, Leeds, England.

Ice Cream Cone Machinery.

Cream Cone Machinery Co., 68 N. Fourth
Street, Philadelphia, U. S. A.

Ice Machine.

Pulsometer Engineering Co., Ltd., 11, Tothil
St., London, S. W. 1.

George Muller, Engineering Works, Magde-
burg Wilh 3. Germany.

Thuringen Eismaschinen, G. m. b. H. Gera
III Thur, Germany.

Knife Sharpener.

Thompson Bros, Digby Street Works,
Birmingham, England.

Lathes.

G. A. Braner & Co., Chemnitz-i-Sa 4,
Germany.

Laundry Equipment

J. A. John A.G., Erfurt, Germany.

Otto Ellerbrock, Maschinenfabrik Und
Kupferschmiede, Hamburg, Barmbeck 2.

Machinery Plants.

Max Friedrich & Co., Leipzig-Plagwitz V
83, Germany.

Machines (General)

Auerbach & Scheibe A.G., Saalfeld Saale 6
Germany.

Machine Tools.

Scriven & Co., Leeds, England.
Wotan Werke A.G. Leipzig, Germany.

Maschinen Export, Heidenreich & Harbeck,
Hamburg 33, Germany.

Machines for Button, Comb, Brush, etc.

Paul Wellhoner, Leipzig, Germany.

Match Machines.

Badische Maschinen Fabrik, Durlach,
Germany.

Milk Refrigerator.

Dairy Supply Co., Ltd., Park Royal, London,
N. W. 10.

Milling Plants.

Moritz Hille G. m. b. H. Dippoldiswalde
b. Dresden.

Mineral Water Apparatus.

Herm Laubach, Kolu-Ehrenfeld, Germany.
Ortmann & Herbst, Hamburg 33, Germany.

Motors.

Hanseatische Motoren G. m. b. H. Hamburg
36, Germany.

Henrich Vogel Akt-Ges, Offenbach a. m.,
Germany.

Moulding Machine.

Haighs Oldham Ltd., 117, City Road,
London, E. C. 1.

Nibbling Machine.

J. B. Stone & Co., Ltd., 135, Finsbury
Pavement, London, E. C. 2.

Oil Engines.

Filding & Platt, Gloucester, England.

Motoren-Werke, Mannherm A.G. Vorm.
Beuz Abt. Stationärer. Motoreubau, Mannherm,
Germany.

Oil Mill Machinery.

Rose, Downs & Thompson Ltd., 28, Victoria
St., S. W. 1.

Liesegang & Kosch G. m. b. H., Magdeburg,
Germany.

Ovens. (Electrical & Steam).

Gebruder Oberle, Villingen, Baden,
Germany.

Paper Bag Machine.

Windmoller & Holscher, G. m. b. H.
Lengerich W. Germany.

Picture-frame Machine.

Jean Heckhausen, Coeln, Lutticher Str., 70,
Germany.

Potato Peeler.

The General Utility Co., Ltd., 209, Cross-
loan Road, Govan, Glasgow.

Pumping Machinery.

The Aldrich Pump Co., Allentown, Penn,
U S A

Joseph Evans & Sons, Culwell Works,
Wolverhampton, England

Preserve Machine.

Richard Heike, Berlin Hohenschon-hausen
E.

Printing Presses (Offset & Litho)

Faber & Schleicher Ltd, Offenbach Am
Main, Germany

Refrigerating Machine.

Schwarzwaldwerke, Lauz K G Mannheim 6
Germany

Rice Mills.

Huchauf & Bulie, Altona Hamburg,
Germany.

Rivetting Machine.

Maschinenfabric W Knapp, Eickel Westf
Germany

Rubber Stamp Making Appliance.

The R H Smith Mfg Co, Springfield,
Mass, U S A

Saw Mills. (Portable)

American Saw Mill Machinery Co, 1364A,
Hudson Terminal, New York City, U S A

Erfordia Maschinenbau, Aktiengesellschaft,
Erfurt, Germany

Screwing Machine.

James N Durie & Co, Ltd, 28 Grove House
Lane, Leeds

Sheet Metal Working Machine.

L Schuler A G Goppingen, Wurttemberg,
Germany

Maschinenfabrik Weingarten Vorm Hch
Schatz A G Weingarten, Wurttleg, Germany

Soap Stamping Machine.

Wilhelm Strassburg, Berlin 027, Markus Str
52, Germany

Soldering Apparatus.

Ernst Hahnel, Heidersdorf, Sachs, Erzgeb,
Germany

Starch Factory Installation.

W H Uhland G m b H, Leipzig

Stone Working Machine.

Maschinenfabrik Herman Hilmer, Witten
Pinhr Amenstr 83, Germany

Tobacco Cutting Machine.

A. Heinen, Verel-i-O, Germany

The John B Adt Co, Baltimore, Md
U. S. A.

Tablet Machines

Duhring's Patent Maschinen-Ges m b H
Berling Lankwitz, 146, Germany.

Tanning Machinery.

The Turner Tanning Machinery Co, Pea-
body, Mass, U S A.

Tin Embaling Machine.

Richard Heiko, Berlin Hohenschouhausen E.

Toilet Paper Machine.

Dietz Machine Works, 126-128, Fountain St,
Philadelphia, U S A

Tools.

The Cincinnati Tool Co, 1955, Waverly
Avenue, Cincinnati, Ohio, U S A

Thomas Smith & Sons, Saltley Mill,
Birmingham

Triturating Machine.

Libtal Engineering Works, Herm Schmidt
Germany

Vulcanising Plant.

A Racusin & Co, Berlin W 8 Germany,
Charlottenstr 25

Tube and Jar Filling Machine.

J Stokes Machine Co, C114, Tabor Road,
Philadelphia, U S A

Water Purification Plants.

Wallace & Tiernan Co, Inc Newark, N.
J, U S A

Weaving Requisites.

Hermann Grosse, Greiz, Germany

Welding Plants.

Antogenawerk G m b H, Stuttgart-
Cannstott 34, Germany

Winding Machines.

Universal Winding Co, Boston, U S A

Wood Working Machinery.

H Herke & Co, Hannover, Germany

Framac Fraukfartes Maschinenfabrik,
G m b H, Gaggenau, Baden

Wrapping & Labelling Machine.

Dentler & Maak, G m b H, Dusseldorf 47,
Germany

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Seebom Rowntree.

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By Thomas Nixon Carver.

4. Increased Production—By E.
Lipson.

5. Industrial Problems & Disputes—
By Lord Askwith.

6. Modern Economic Tendencies.—
By Sidney A Reeve.

BREWING AND MALTING.

BREWING is the process of making fermented drinks, such as ale, beer, cider, etc.

MALTING.

Malting is the preparing of cereals by germination or growth for the process of mashing. Barley is the grain commonly used for making malt for lager beer, ale, stout, vinegar and yeast makers' or distillers' mash, etc., while wheat malt is used to a large extent in the production of weiss beer.

The barley is first cleaned in order to remove foreign seeds, straw, broken kernels, etc., by means of sieves and blower fans. As the character of the beer depends largely upon that of the malt and, as the latter's character can be determined during malting, great care must be evinced in the details of malting. This process is carried on in several stages described below.

STEEPING.—Malting is in reality an artificial or forced growth of a seed, the changes taking place being similar to those when the seed is planted in the soil. The first requisite is moisture. This is given to the grain by placing it in steep tanks containing water of a certain temperature. Steep tanks are cylindrical iron vessels having conical bottoms so that all the grain will drop out when tank is emptied. They are

generally placed on the top floor of the malt house. The grain remains in the steep tank until it has absorbed the desired amount of water, the time differing for different kinds and quality of grain or the process of the maltster. For barley the duration of steeping is generally from 36 to 60 hours, averaging about 48 hours.

GERMINATING FLOORS.—The malt-house usually consists of several floors. The water in the steep tank is drained off and the wet barley dropped upon these floors below. The barley is now spread in heaps of about 12 to 14 inches

high. It dries out somewhat and begins to sprout or grow and small hair-like fibres, called rootlets, begin to show. As heat is generated during growth, which is undesirable above a certain temperature and as further proper growth re-



Fig. 1. Modern Malt Kiln.

quires pure air, it is necessary to aerate the growing barley (now called green-malt). This is done by what is called "turning the heap", which consists in reshoveling the green malt in such a manner that the lower kernels of the old heap will be at the top in the new heap. During turning, the green malt is thrown through the air in a thin sheet or stream, whereby it is aerated and cooled. The new heap now occupies a larger floor

space, is consequently of less height on the floor. This turning is repeated at regular intervals so that at the end of the growing period the heap covers the entire floor to a height of from five to six inches. This growth usually takes about five days, during which time water is sprinkled upon the heap whenever it becomes too dry.

KILNING.—After the green malt shows the desired degree of sprouting it is necessary to quickly check further growth. This is done by drying it upon the kiln. The green malt is shoveled by means of a power shovel to one end of the floor where it drops through an opening into a bucket elevator and is conveyed to the kiln. The kiln usually has two floors placed one above the other made of strips of wire or perforated sheet metal and heated by means of an open fire from below. Above the upper floor in the dome, drafts are placed to carry off the vapours. In more modern constructions suction fans are used to promote drying. The green malt is spread evenly upon the upper kiln floor about 18 inches high, where it remains for 24 hours, during which time it is only partially dried. It is now dumped or dropped upon the lower floor. This is effected by mechanical dumping floors which turn open in sections on an axis or bearing like the grate in a furnace. The malt on this lower kiln is again spread evenly and then subjected to a higher temperature until the desired degree of dryness is obtained, which usually takes from 20 to 24 hours.

MALT CLEANING.—The malt as it comes from the lower kiln is not yet

suitable for brewing as it contains the rootlets and some kernels that were crushed or injured on the floors or during conveying. The malt now passes through cleaning machines consisting of sieves and blowers which remove the rootlets, dust, small and broken kernels.

BREWING.

BREWING MATERIALS.—Barley malt is the most important material and is generally used. It gives to the beer not only its substances, but also to a great extent its character. Malt also supplies peptase and diastase, two substances that change the nature of certain other constituents during mashing.

Peptase changes the insoluble albuminoids of the malt into soluble or desirable ones. Diastase changes the unfermentable starch contained in the malt and other materials into fermentable sugars and dextrins.

Caramel and black malt, consisting of ordinary malt, that has been treated differently during malting, are used to impart colour to the wort in order to produce darker beers, also to impart to

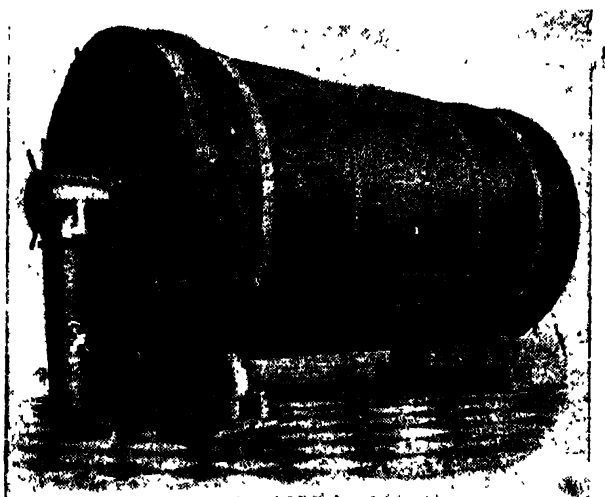


Fig. 11. Germinating Drum.



Fig. III. Varieties of Hops.

the beer a more pronounced malt aroma or flavour. Only a small amount, proportionately, of these are used mixed with other materials.

Malt adjuncts or other starch containing materials, and brewing sugars are used for the triple purpose of producing more durable beers, since these adjuncts contain very little albumen; of producing paler beers than could be made with malt alone; and for reducing the cost of production. These are rice and corn products, such as corn grits, corn meal, corn starch, corn flakes, and brewing sugars, glucose, etc. Flakes are made by steaming corn grits and passing them through hot steel rollers in order to change them so as to dissolve better during mashing. Flakes and sugar, such as grape sugar, glucose, etc., are sometimes used, instead of corn grits or rice (which require cooking) when a cooker is not installed. Flakes are added directly to the mash in the mash tub, and sugars are used to a moderate extent

only as a brewing material for larger beers, finding more extended use in the production of English beer such as ale, stout, etc.

Hops are added to the boiling wort for the purpose of imparting (1) tannin which aids in the elimination of undesirable albuminoids in the wort; (2) hop oil, which gives the beer its hop aroma, and (3) hop resin, which gives the beer its bitter taste and further more tends to preserve it. Water acts as a solvent for the substances contained in the beer. Its composition has considerable influence on the character of the beer produced. It must contain certain mineral substances.

BREWING OPERATIONS.—A well-equipped brewery is usually divided into three departments namely, the mill house where the materials are prepared and weighed; the brew house, where the wort is produced, and the cellars where the wort is fermented and treated to produce the finished beer. The arrangement is on the gravity plan, that is, in each department the material of wort or beer is elevated or pumped only once to the top and from there descends through the different stages of manufacture by gravity.

MILL HOUSE.—Here the malt is cleaned and stored. The desired amount of malt for the beer is weighed out in a scale hopper, and from thence passes through malt mill where it is crushed so as to loosen the starch in the kernels. The crushed malt is then transferred to the storage hoppers in the brew house ready for use. Rice and corn goods are either stored in the mill house,

weighed in bulk and elevated to a storage hopper in the brew house, or dumped (usually in smaller breweries) directly from the sacks into the cooker.

BREW HOUSE.—The brew house generally contains the following vessels: hot and cold water tanks; malt and cereal (rice or corn) hoppers; the cereal cooker, mash tub, kettle, and hop jack and cooler.

MASHING IN CEREAL COOKERS.—Cookers are of two kinds; open ones or as they are usually called, rice tubs, and closed or pressure cookers. In these vessels rice or corn (grits or meals) is boiled for a certain length of time in order to loosen up or soften the hard flinty condition of their starch so as to render it able to be more completely dissolved or acted upon on the mash tub. Crushed malt to the amount of about one quarter the weight of corn goods is added in the open cookers. The mashing method in the open cooker varies somewhat among different brewers. The general method pursued is briefly outlined below.

The materials are mixed with water so as to have a temperature (100 deg. F.) The mash is held at this temperature for about 15 minutes then run up to 158 deg. F, and held for 30 minutes then heated quickly to boiling and boiled from 45-75 minutes for corn goods depending on the fineness of the material, and 30 minutes for rice. The cereal mash is then run down to the mash tub where the mash is finished. Pressure cookers are used to some extent. They differ from the open cookers in that, being closed the mash can be boiled under

pressure and consequently, at a higher temperature than in open cookers. Hereby a more complete softening or dissolving of the starch is obtained and consequently a better yield or extraction of the materials

MASHING IN MASH TUBS.—The mash tub, like the open cooker, has a stirrer and a heating coil, but is further supplied with a strainer or perforated false bottom for clarifying the wort, and a sprinkling device or sparger for washing out the grains. In the mash tub the mash is started and, when the mash from the cooker has been added, the combined mash is finished. The mashing method here varies considerably depending upon the character of the beer that is to be produced, and is consequently one of the most important of the brewing operations.

The method of mashing for the production of a beer of average character is approximately as follows: The crushed malt and water are mixed so as to have a temperature of 100 deg. F. and mash allowed to rest at this temperature for 1 hour. The temperature of the mash is now raised to 153 deg. F. in about 15 to 20 minutes by running in the boiling corn or rice mash from the cooker with the addition of steam if necessary. This temperature is held for 10 to 15 minutes, during which time the stirrer is operated continuously. It is at this stage that the diastase in the malt inverts or changes both the starch contained in the malt as well as that in the corn or rice into unfermentable dextrin and fermentable sugars.

The mash is now heated with steam and hot water, in 15 to 20 minutes, to

165 deg. F. and the stirrer stopped. The mash is now allowed to rest from 30 minutes to one hour in order to allow the hulls of the malt to settle so as to act as a filtering material for the wort, after which the wort is run into the kettle. After the wort has run off, the solid substances remaining in the mash tub called "Grains", are washed out or sparged with water in order to recover as much of the wort contained in them as possible. The grains are then thrown out of the mash tub and sold as cattle feed.

BOILING THE WORT IN KETTLE—The kettle consists of a pear-shaped copper vessel having a double or jacketed bottom for heating the wort and a vent pipe

to roof for conducting off the vapours generated during boiling. The steam outlet of the coil or jacketed bottom is connected to a steam trap which automatically discharges the water condensed in the coil or jacket without materially reducing the pressure of the steam. The wort as soon as it runs clear from the mash tub is collected in the kettle. Steam is turned on in the kettle as soon as the jacketed bottom is covered with wort. This wort, and that continuously running in is then heated to and kept at about 190 deg. F. in order to destroy the action of the diastase and prevent further saccharification in the wort taking place when the kettle is full or nearly so, steam is further turned on and the

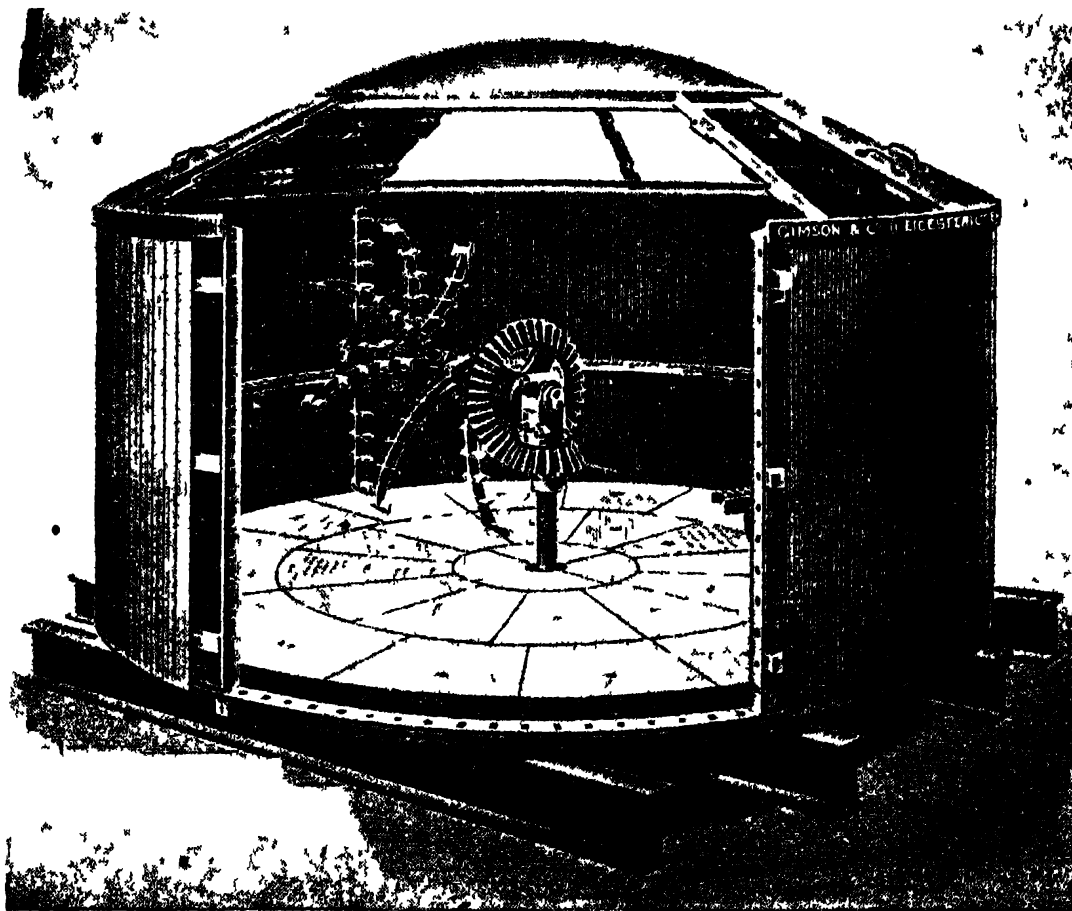


Fig. IV. Mash-Tun with Sectional View.

wort brought to boiling and boiled for one hour when it should show a good "break." During the boiling the undesirable albuminoids are precipitated in finely divided form, rendering the wort turbid. Upon continued heating these albuminoids unite or lump together and leave the wort between these lumps clear and transparent. This clarification is called the "breaking" of the wort.

Hops are now added, usually about two-fifths of the total amount used, after which addition the wort again becomes turbid due to the further precipitation of albuminoids by the tannic acid contained in the hops. After about 40 minutes further boiling the wort should again clarify or show its second break when another two-fifths of the hops are added and the wort boiled about 20 minutes. The remaining one-fifth of the hops are added and the wort run out of kettle into hop jack immediately. This last quantity of hops is usually of a better quality and is not boiled with the wort as its addition is for the purpose of imparting the hop aroma to the wort. This aroma is due to the oil of the hops which is volatile at boiling temperature and would escape, and be rendered useless if the wort were boiled for any considerable time. All or part of the last hop addition is sometimes placed in the hop jack and the boiling wort run upon it.

WORT IN HOP JACK.—The hop jack consists of a round or square iron tank, having a perforated false bottom or strainer and a sparger, or sprinkler, similar to that of the mash tub. The wort,

with the hops is run into the hop jack and allowed to rest until the hops have settled so as to form a filtering material for the clarification of the wort. As soon as this takes place the wort is pumped to the surface cooler or beer tank located at the top of the cellars. After the wort has all been removed the hops are washed out or sparged with hot water in order to recover as much of the absorbed wort as possible.

SURFACE COOLER & BEER TANK.—The surface cooler consists of a shallow iron pan of a length and width very large in proportion to its depth so as to give the wort as much surface as possible. Hereby the wort is cooled quite rapidly and aerated.

The beer tank, an iron cylindrical vessel closed at the top, is rapidly supplanting this cooler, since the latter, by the large surface it presents endangers the wort to infections by impurities or germs always more or less present in the air. As soon as the wort on the surface cooler in the beer tank cools to about 145 deg. F. the danger of its infection by impurities, bacteria, etc begins. From the stage until the beer is finally marketed months later, it requires the daily, almost hourly vigilance of the brewer to keep it pure and free from contamination.

BANDELOT COOLER.—This consists of a series of pipes or tubes arranged in vertical tiers, over the outside of which the wort flows, while through them the cooling medium is circulated. It is usually made in two sections, the upper being of copper tubes, containing cold water,

and the lower of steel containing ammonia.

THE CELLARS.—The wort after cooling enters the cellars where it is fermented, stored, lunged, fined, filtered and racked ready for market.

FERMENTATION OF WORT.—The wort as it comes from the cooler is run into fermenting tubs in which the yeast has previously been placed. Sometimes the yeast is added after the tubs are filled with wort. The yeast, from one to one and a half pounds to the barrel of wort, is usually given, not in its natural state, but first mixed with an equal quantity of wort and thoroughly aerated.

The fermentation now begins within 15 to 24 hours while bubbles appear on the surface around the side of the tub. The wort at this time is covered with a head of thick, lumpy consistency composed largely of albuminoid matter. The whole surface now soon becomes covered with a fine white froth which soon changes to a frizzled appearance technically known as the "Kraeusen" stage. The froth head then moves toward the centre, the fermentation becomes more active, the froth head rises higher and becomes darker and the fermentation now passes into the "high kraeusen" stage, generally after about 70 to 80

hours. This stage is maintained for about 48 to 72 hours when the head begins to collapse and deepens in colour to the end of the fermentation. The temperature is then gradually reduced by means of cooling attemperators to 39 deg. F. in the next 3 or 4 days. The total duration of fermentation is from 10 to 11 days.

STORAGE OF BEER.—After the wort is fermented the beer is filled into storage vats (closed at the top) where it is stored at a temperature near the freezing point for about two or three months. During this storage period there is a slight progress of secondary or after fermentation and the yeast settles, and

what is most important in bottle beer that is to be pasteurized, there is a further precipitation of albuminoids.

CHIP CASK TREATMENT. — When sufficiently matured in storage the beer is run or pumped into the chip casks, so called because in them wooden chips are

placed to retain the sediment produced by the finings. In the chip cask, two properties must be imparted to the beer that it did not possess during storage, namely, life or proper amount of carbonic acid gas contents, and brilliancy. Life is given to the beer by addition of 8 to 10 per cent of kraeusen, (that is, young beer in the first, or kraeusen stage

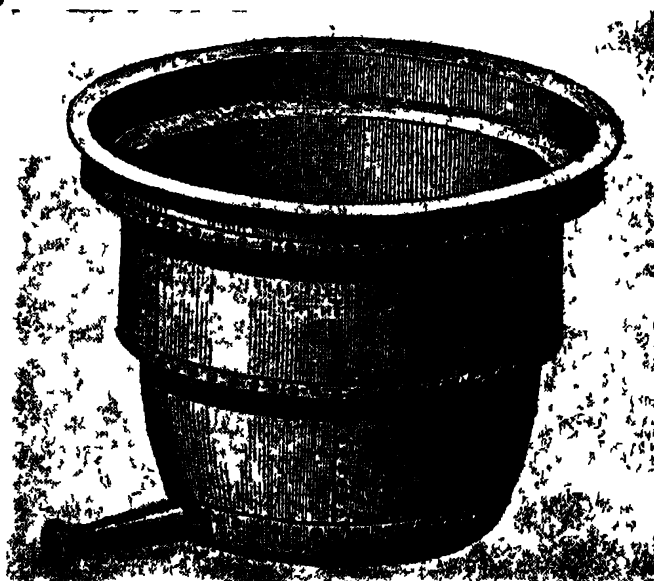


Fig. V. Wort Fire Copper.

of fermentation). This when added to the old "flat" storage beer continues to ferment, and, as the cask are closed the gas generated gives life to the whole amount of beer contained.

For bottle beer, kraeusen made from grape sugar is used, as grape sugar contains no albuminoids as does the kraeusen from regular fermenting wort.

Brilliancy is given to the beer by removing the yeast and other particles in suspension by means of fining made from isinglass. After bringing the cask a certain pressure only ($4\frac{1}{2}$ —5 pounds) is desired and any excess pressure generated above this is automatically removed by an automatic blow-off device called the bunging apparatus.

FILTRATION OF BEER.—Although beers will generally become clear in the chip cask if they are left there long enough, they are now almost universally filtered after they have become moderately fine (clear) in the chip cask. Thereby much time is saved, also a large part of the finings and chips. Further more, filtration furnishes a more brilliant beer than can generally be obtained by chip cask treatment only. Modern beer filters differ considerably in construction, but are all alike in that they contain several or many compartments or cells

filled with filter mass or pulp (a substance similar to blotting paper) through which the beer is forced. The filter mass or pulp can be used again and again, being washed after each use to remove the beer and sediment it collects during filtration. The operation of filtration is as follows: The bunging apparatus is discontinued and air pressures (15 to 20 pounds) is then put on the chip cask and the beer thereby forced through the filter.

RACKING OF BEER.—From the filter the beer passes to the racking bench which must be placed at a higher level in order to cause a back pressure upon the filter and prevent foaming. The racking device consists of two or more faucets of which one is always open so as to give a steady flow of beer.

CARBONATING.—Beer is often carbonated. This is the mechanical forcing of carbonic acid gas into the beer by which time, labour, space and cost of chip casks are saved, besides obtaining a more durable beer.

PITCHING & VARNISHING.—In order to prevent the beer in wooden vessels from soaking into the wood, they are coated on their insides with an inert or insoluble substance. This is shellac varnish for the large brewery vessels, and pitch for the trade packages.

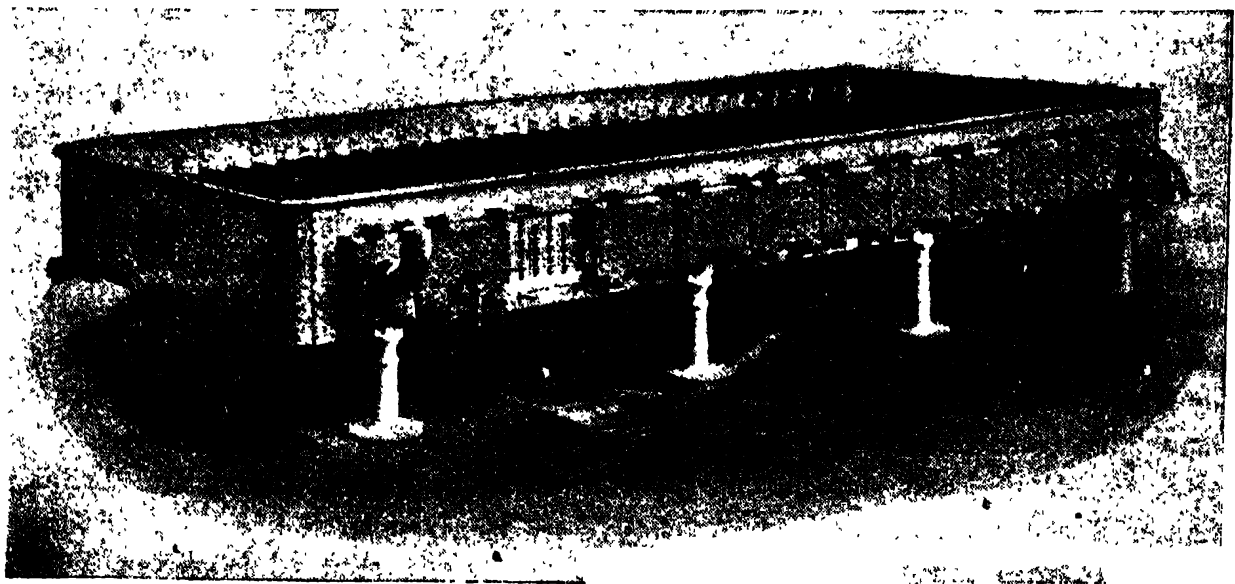


Fig. VI. Refrigerator.

SMALL INDUSTRIES.

(BY A PRACTICAL EXPERT.)

BY Tambul Bilas and similar other names are denoted a class of preparations which are used as concomittants with betel leaves—the universal masticatory of the Indian people. A wide range of spices enters into its composition and it is put into tin pots in the form of paste. It is used to disguise the bad odour of mouth and for scenting the breath imparting a pleasant feeling. It is taken at the end of a tooth-pick and is comparable with Sen Sen.

Tilak is a mark on the forehead either at the base of the nose or at the parting of hair. Vermilion is universally employed for the purpose. Ladies, with fastidious tastes, would however prefer bottled preparations recipes of which are here given.

Our readers are most probably familiar with different types of Indian drums. *Dholak* is the most common form of drum. *Pakhawaj* is an elongated drum with leather covering at both ends. *Tabla* is a drum with one covering only, but it is of two kinds, the right-handed one and the left-handed one (*Bawa*).

The sound of these drums is regulated by the application of a black paste, known as *Kharan*, applied in the middle of the leather surfaces. We give a few recipes for the preparation and application of *Kharan*.

On a small scale glass can be prepared by fusing together sand and alkalies. The fusion can be effected at a comparatively low temperature by adding a quantity of broken glass pieces

as cullets. The product is made transparent by the addition of orpiment, and can be coloured by melting suitable ingredients with the mass. For the purpose of melting glass a suitable furnace of special design must be constructed. The molten mass can be made into plates, moulded into desired shapes or worked otherwise.

(1) Tambul Shovana.

Pollen of Keora	.....	1 ch.
Nutmeg	.....	1 tola.
Seeds of cardamom minor		1 ch.
Keora Water		q.s.
Sandal Otto	.....	30 min.

Macerate pollen, nutmeg and cardamom together in a mortar and pestle with keora water to form a paste. Perfume it with otto and pack in a tin pot.

(2) Monmohini.

Rose petals	.....	1 ch.
Seeds of cardamom major		$\frac{1}{2}$ ch.
Seeds of cardamom minor		$\frac{1}{2}$ ch.
Chua	.....	1 tola.
Rose Water		qs.

Select fresh petals of red rose. Macerate these together with cardamom seeds in a stone mortar with rose water. Mix *Chua* with the paste.

(3) Kashmiri Kesar.

Saffron	.....	1 tola.
Seeds of cardamom minor		2 tola.
Cloves	.....	4 as.
Pollen of Keora	.....	$\frac{1}{2}$ tola.
Musk	.....	1 a.
Keora Water		q.s.
Chua	.....	1 tola.

Mix together the solid ingredients and macerate the mixture with keora water to form a paste. Lastly incorporate *Chua* with the paste and put in gallipots.

(4) Nepali Kasturi.

Saffron	.....	.....	$\frac{1}{2}$ tola.
Seeds of cardamom major			2 tola.
Nutmeg	.....	.....	$\frac{1}{2}$ tola.
Liquorice powder	.....		1 tola.
Pollen of Keora	.....		1 tola.
Musk	.....	.....	2 as.

Macerate the solid ingredients with keora water in a stone mortar and store in gallipots.

This should not be used more than 7 to 8 times a day. It is very heat-producing and can be resorted to in the winter season.

(5) Tambulamrit.

Cloves	.....	.....	1 tola.
Seeds of Cardamom			
minor	.....	.....	2 tola.
Cinnamom	.....		$\frac{1}{2}$ tola.
Rose Water	.....		q.s.
Chua	.....	.....	1 ch.

Macerate the solid ingredients in a stone mortar with rose water to a paste. Mix into this paste *Chua* and store in gallipots.

(6)

Liquorice powder	.....		$\frac{1}{2}$ ch.
Pollen of Keora	.....		$\frac{1}{2}$ ch.
Seeds of Cardamom major			1 tola.
" " " minor			1 tola.
Cloves	.....	.....	1 tola.
Cinnamon	.....		1 tola.

Mix these ingredients together and macerate in a stone mortar with the requisite quantity of rose water. Then pulverise finely

Saffron			1 tola.
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Mix with the above paste and put in gallipot.

(7)

Cariander Seed; Aniseed; Parsley; Nutmeg; Ajawan; Saffron; Seeds of Cardamom major; Seeds of Cinnamom minor; Cloves; Dry rose petals.

Take one tola each of the ingredients and soak them in good rose water for 12 houfs. Then bray them together to a paste form and incorporate

Chua	.....	.....	1 tola.
Camphor	.....	.....	1 a.

Tilak.

(1)

Lac bangle dust	.....		1 tola.
Gum Arabic	.....		1 a.
Mica dust	.....		1 tola.

Broken pieces of lac bangles are available in the market. Procure some and pound into powder. Mix the red dust thus obtained with powdered gum arabic and bray into a paste with a sandalwood muller adding rose water. Incorporate mica dust into this paste and store in a glass phial.

(2)

Carmine	.....	.....	15 grs.
Gum arabic	.....		2 gr.
Bronze Powder	.....		1 gr.

Macerate the first two ingredients with rose water in a stone mortar. Mix the bronze powder into the paste. Put up in a phial.

Khara for Tabla.

Our readers must have noticed the thick black coating in the middle of the Indian drum. It is made as follows.

First of all the piece of leather is trimmed to fit the end of the drum.

Then take a handful of cooked rice and spread it evenly at the middle. Rub it with a piece of smooth stone. Thus the rice starch will be laid thin like paper. Form into a perfect circle with a blunt chisel and dry in the sun. Now take a quantity of iron rust: pound it finely and sift through several pieces of rag held together. Add to the fine dust a quantity of cooked rice and pound into a soft paste. Lay a little bit of this paste evenly on the white circle as made above and rub as before with a very smooth stone pellet. In a little time it will begin to shine. Then put on another layer of the paste and rub with the stone. Repeat the process 5 or 6 times.

Difficulty lies in tuning the instrument properly. As the layer is being gradually thickened care must be taken to ascertain the tone and to stop when it comes up to the required standard.

The starch-iron paste prepared as above is generally alluded to as *Kharan*.

Bawa.

The *Kharan* for Bawa is applied eccentrically the diameter being divided in the proportion of 1 to 2. The base is made up with equal proportions of soaked flattened rice and cooked rice. The mixture is mashed up into a paste which is applied in a circle (1 to 1½ inch.) when it is dry apply a film of *Kharan* and rub with stone. Repeat the operation with 4 to 5 layers.

Dholak.

The covering leather for the Dholak must be a thin one. It should be trimmed to fit nicely. The base is formed on the inside of the left hand frontage. Soak a handful of flattened rice (*chira*) and

mash into a paste. Apply it in a circular manner and dry by rubbing a stone pellet. Afterwards spread a thin film of starch iron paste (*Kharan* for *Tabla*) over the base and rub with a stone pellet until it shines. Repeat the operation once more.

Kharan for Pakhawaj.

(a) FOR THE RIGHT SIDE.

First trim the leather piece to fit the right hand end. Powder some gum arabic and boil with water until it dissolves. Add to this a handful of cooked rice and form into a paste. Lay this on evenly with the finger to form the base perfectly circular in shape. Put on this a layer of the *Kharan* paste (that for *Tabla*), and rub with the stone pellet. Repeat the operation for 5 or 6 times. The dimensions of the circular layers will diminish gradually after each application. It must be tuned in the usual manner.

(b) FOR THE LEFT SIDE.

Knead a quantity of flour into smooth soft dough with water. Lay this on with the tip of the finger and rub with the stone. It should be spread in a circular shape thinly towards the edges and comparatively thickly at the centre.

It is apparently a temporary measure resorted to in regulating the sound of the drum in operation. The paste is removed gently after it has served its purpose.

Manufacture of Glass.

(1)

Take 50 oz. of clean white sand, 20 oz. of carbonate of potash, 10 oz. of white lead, 1 oz. of potassium nitrate; 50 oz. of white glass pieces. Put together these ingredients in an iron pot and place in a very hot furnace. An excep-

tionally high temperature will be required to melt the ingredients into glass.

(2)

Take clean white sand 25 oz; white glass pieces 25 oz; soda ash 8 oz. 6 dr.; hydraulic lime 1 oz. 2dr.; dry oxide of arsenic 1 dr. Put these ingredients together and fuse as before. The molten mass can be moulded as desired.

Coloured Glass.

Red.

Take 100 oz. of clean white sand, 100 oz. of white sajjimati, 100 oz of nitre, 100 oz. of plantain tree ash. Mix these things together and put in very hot oven. To hasten the fusion add to the mass 20 oz of red lead and subsequently 5 oz orpiment. To colour the glass add 25 oz of powdered mercury sulphide.

Yellow.

Take 25 oz of clean white sand, 25 oz of sajjimati; 25 oz of good nitre; 25 oz of plantain tree ash. Mix together these things and melt in very hot furnace. To hasten fusion add 5 oz red lead. To make the glass transparent add 1 oz orpiment. To colour it mix 1 oz of gamboge powder in the molten mass.

Green.

Take 50 oz of clean white sand; 50 oz of glass pieces, 17 oz 4 drs. of soda ash, 2 oz 4 dr. of hydraulic lime; 2 dr. of dry oxide of arsenic. Mix these ingredients together and put in the furnace when the mass has melted throw in 20 oz of *Jangal*. The product will be nice green glass.

Looking Glass.

Take a piece of even and plain glass plate. Cleanse it with ash and wipe with

rag. Then evenly spread over it a tin foil and stretch it with a soft flat brush. Fix the plate perfectly horizontal: pour on the leaf a quantity of good mercury and distribute it all over the leaf. Now take another glass plate of the same size and holding it on the first one apply uniform pressure. Tin and mercury will form an amalgam and a nice looking glass will result.

GLOSSARY.

Aniseed—*Mauri*.
 Carraway—*Ajowan*.
 Cardamom, major—*Bara elaich*.
 Cardamom, minor—*Chhota elaich*.
 Cinnamon—*Dalchini*.
 Cloves—*Labang*.
 Coriander—*Dhamia*.
 Flattened rice—*Chira*.
 Liquorice—*Jastimadhu*.
 Musk—*Kasturi*.
 Nutmeg—*Jaitri*.
 Pandanus—*Keora*.
 Parsley—*Radhuni*.
 Saffron—*Zafran*.
 Soda ash—*Sajjimati*.

Chua is a tarry but odoriferous product obtained by distilling dammer in Orissa.

The alkaline ash obtained by burning the plantain tree is useful in many respects as it contains a high percentage of potash. *Jangal* is the vernacular name for a dye intermediary obtained from *Mallotus philippinensis*.

16 as.	1 tola.
5 tolas	1 ch.
16 ch.	1 sr.

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Small Trades & Recipes.

Preserving Honey.

After the honey is passed from the comb, strain it through a sieve, so as to get out all the wax; gently boil it, and skim off the whitish foam which rises to the surface, and then the honey will become perfectly clear. The vessel for boiling should be earthen, brass or tin. The honey should be put in jars when cool, and tightly covered.

Pale Copal Varnish.

Fuse 8 lb. second sorted African copal, add $2\frac{1}{2}$ gal. clarified oil. Boil slowly together for 4 or 5 hours until quite stringy; add $5\frac{1}{2}$ gals. turpentine mixed with $\frac{1}{4}$ lb. dried copperas, $\frac{1}{4}$ lb. litharge; strain, and pour off. In order to hasten drying, mix with the above while hot 8 lb. second sorted gum animi, $2\frac{1}{2}$ gal. clarified oil, $\frac{1}{4}$ lb. dried sugar of lead, $\frac{1}{4}$ lb. litharge; $5\frac{1}{2}$ gal. turpentine. This varnish will, if well boiled dry hard in 4 hours in summer or 6 in winter. Some copal varnish takes, however, 12 hours to dry. This varnish may be used for the best grained work, as it dries well and has a good gloss.

Wheat Starch.

Wheat starch is usually made from flour, either by the old-fashioned method of allowing the mixture of flour and water to ferment in vats and then purifying the starch by settling in which case gluten is destroyed by fermentation and a thin boiling starch results, or by the Martin process, in which the gluten is saved and a thick-boiling starch is produced. In this latter process, masses of

dough made by moistening the flour are placed in a special kneading machine in which the dough is kneaded, by ground roller working in a winging frame, the starch being washed out through sieves by jets of water, settled and passed over runs. The resulting starch when dried and finished is thick-boiling and the gluten, still containing several per cent. and of starch which it is impossible to remove mechanically is recovered as a rubbery mass.

"What to do in Case of Snake-Bite."

(Contributed.)

(1) Apply at once a ligature of cord around the limb about two or three inches above the bite and tighten it.

Apply two or three other ligatures above the first one; at intervals of a few inches and tighten them also.

(2) Administer a good dose of stimulant brandy and sal-volatile to counteract failure of the heart, and repeat it if necessary.

(3) Allow the wounded part to hang down and bathe it with warm water to encourage bleeding.

(4) Lay open the one or two holes made by the snakes fangs (teeth) with the tip of a knife blade. Pass the blade down into the wound and cut outward; cut lengthwise rather than around the limb and rub into it crystals of Permanganate of Potash (moistened with water) to destroy the poison of the snake-bite.

(5) If the breathing is impaired or arrested perform artificial respiration.

INDIA'S INDUSTRIAL PROGRESS.

Progress in all Directions.

Sir Montague de P. Webb, addressing a meeting on "Recent Progress in India," in London, said that India, had for long been making steady and continuous progress in all directions. With the establishment of a Department of Agriculture it had been possible to produce better qualities and larger yields in several of India's chief crops. Increased knowledge and energy had not been confined to agriculture. Coal, petroleum and manganese ore had been unearthed in large and increasing quantities, while the output of gold, silver, lead, salt, saltpetre, iron, tin, mica and cement now amounted to a considerable sum.

India is now the chief industrial country in the tropics and the eighth largest in the world. In the last official year we were able to sell overseas surplus products valued at over £288,000,000—the largest sum that India had yet realised abroad in one year. We imported in the same period some £255,000,000 worth of goods. The great irrigation project in course of construction in Sind, the Punjab, and the United Provinces, would, when completed and in full yield, add to India's agricultural possibilities an area more than twice that of cultivated Egypt and a volume of produce—wheat, cotton, rice, oil-seeds, etc.—worth more than £50,000,000 a year. His conclusion was that the Indian prospect was good and inspiring.

Silk Institute in Bengal.

The Government of Bengal has just sanctioned the establishment of a Silk Weaving Institute at Berhampore (Bengal) where arrangements will be made for the teaching of improved processes of silk rearing and dyeing including power weaving. The institute will pro-

vide for the training of thirty artisan students in one year's course, and twenty higher grade students in a two year's course. It is also proposed to make provision for the installation of a portable steam engine and boiler for the training of young men of the 'bhadralog' class in the work of the power looms.

Mango Industry of Bombay.

In the middle of last year a committee was appointed by the Government of Bombay to report on the present organisation of marketing mango products in the Konkan and to make recommendations for its improvement. The committee has just brought out its report. It is pointed out that there are over 5000 acres under regular mango plantations in that place while scattered in the neighbourhood are innumerable mango groves. It is estimated that the total export trade amounts annually to about Rs. 20 lakhs. This mango is the chief agricultural product of this district as also of Ratnagiri. The Committee has made many plausible suggestions for the improvement of the trade.

Glycerine In Madras.

Glycerine is an important bye-product of the soap industry. It is recovered from the spent lye resulting in the usual process of soap manufacture. The glycerine plant which has been recently installed in the Kerala Soap Institute, Calicut, enables the factory to prepare 80 per cent. crude glycerine. If a ready market be assured for the product the soaps will be made cheaper. A causticising plant for the production of caustic soda from soda ash has also been installed but the results are not as yet satisfactory.

SCIENTIFIC AND TECHNICAL TOPICS.

The Radio Eye.

An apparatus by which moving objects miles away can be seen by radio, has been successfully demonstrated at Washington by an American scientist and inventor. The invention was tried out successfully two years ago when action pictures were recorded in a room adjoining that where the "radio eye," which was said to be the secret of the invention, was placed. The eye, consisting of a polished mirror of gradual thickness, and a number of smaller mirrors, in its revolutions, breaks up the image of the picture into thousands of flashes reflecting them into a photo-electric cell. The flashes take a number of moving objects and in reproducing them on the screen give a continuity of action similar to that of the cinema.

An Electric Stethoscope.

The basic elements of the electric stethoscope include a vacuum tube amplifier, smaller in a general way to those which speed your voice over long-distance telephone lines; a group of wave filters which eliminate undesired sounds, and transmitter and receivers of special design. In the telephone plant, filters are extensively used to enable more than one conversation to be carried over the same long-distance circuit. Differing in the requirement that it must pick up

sounds from the body rather than from the air, the stethoscopic transmitter hardly resembles the familiar telephone transmitter. Its rubber button is pressed against the patient's body; a rubber rim cuts down vibration from the hand which hold it. Since extreme quiet is essential to pick up the tiny sounds of greatest importance room noises are shut out by fitting the receivers with stethoscope tubes which enter the physician's ears in the familiar manner.

Light In Food.

The value to children and all growing animals of cod-liver oil is well recognised. The vitamins present in this particular oil are just those most needed in the early years of life, particularly if the child is to avoid those diseases of malnutrition. One of these diseases is rickets, and rickets, according to statistics, has been on the increase during the past few years owing to the failure of mothers to appreciate the need of vitamins in the child's food. According to recent experiments olive oil and lard can be treated so as to replace cod-liver oil in the baby's diet. As bought on the market, neither of these contain vitamins, owing to the fact that they have had to pass through numerous processes during their manufacture and refining that destroy these important accessory

food factors. It has been shown that these can be generated in manufactured and refined lard and olive oil by radiations from mercury-vapour quartz lamps. The light from these lamps is exceptionally rich in ultraviolet rays, and these appear to synthesise the vitamins required for growth and bone-formation.

Printing By Camera.

Two British inventors have just perfected a process of typesetting by photography. According to expert opinion their invention will revolutionise principles of printing that have been in use since Caxton's time 450 years ago.

In effect, the machine does away with metal type by substituting for it a film upon which letters, figures, etc., have been photographed.

By means of a key-board, operated like a typewriter, letters and characters from a "master film" are projected, one by one, in rapid sequence on to a sensitised photographic film base, and photographed, the "exposure" being made in a fraction of a second.

This exposed film, when developed, corresponds to the "set-up metal" or type-line of a modern composing machine. Having reached this stage, printing may be done in many different ways—by line-block for letterpress printing, by direct litho, by photographic processes from plate or stone, or by the off-set photo-litho throughout.

Different sizes of type are obtained by an adjustment of focus of the lens of the camera, which projects the "master-film" image, this operation being completely automatic. A single spool of "master-film," 2in. in diameter, and 3in.

wide, contains the equivalent of 2,700 "founts," or complete sets, of type.

It is claimed that the invention will save millions of pounds to the printing industry and that application of wireless telegraphy to it will enable a machine installed in, say, a London printing works to "set up" the same matter simultaneously in many provincial towns.

Coal Distillation.

Experiments have been for some time in progress at the British Fuel Research Board as to the possibility of enriching the gas yielded from coal by injecting oil into vertical retorts so that the oil should reach that portion of the retort which is at a suitable temperature.

The oil is introduced through a water-cooled tube, and the mere introduction of this tube has been found to cause a reduction in the gas yield, while increasing the heating value of the gas. When oil is injected, however, there is an increase both in the heating power of the gas and in the amount of gaseous therms emitted. The working of the retorts was found to be as steady as in normal conditions, but it was necessary to alter the position of the injection tube from time to time in order to enable the coke to remove carbon deposits from the wall of the retort opposite the end of the tube.

It does not appear practicable to inject more than 10-15 gallons of oil per ton of coal, as if this amount is increased a certain portion of the oil pastes over into the tar, and a certain amount of condensible hydrocarbons appears in the gas. In the conditions under which the experiments were conducted the yields and qualities of coke, tar, liquor, and ammonium sulphate were not appreciably effected by the injection of the oil.

FORMULAS, PROCESSES & ANSWERS.

Linen Finish of Cotton Cloth.

1459, D. V. N., Godavari—Writes, I wish to know about the process of finishing cloth.

It is easy to understand that the attempt to impart to high grade cottons the appearance of linen fabrics, should have led to the introduction of a number of various methods calculated to accomplish the purpose in view.

The simplest of these is to treat the dry goods in the mangle in the calender at a low pressure, to prevent the threads from being crushed too flat, and then damp them with water containing a specially prepared dressing. The dressing is prepared by mixing 20 parts of wheaten flour with 112 parts of hot water, the mixture being boiled and mixed with a decoction of 20 parts of wheaten starch in 70 of water. Another 20 parts of wheaten starch are mixed with 70 parts of slightly warm water and a little indigo laundry i.e., the mass being used hot for starching. The resulting preparation contains on the whole 60 parts of starch, and when made up with the lb. and unit weight, will suffice for 77 yd. pieces of material so that 2½ lb. of dressing will be in each yard of stuff—a fairly large amount.

Removing Spots & Stains from Leather.

1542 C. P. H., Calcutta—Asks how the mixture of salt and lemon juice is to remove spots and stains from leather.

An oil spot on leather may be removed by dipping a piece of rubber in naphtha and rubbing over the spot. For dirt from the hands, a little oxalic acid well diluted may be used. Wash the dirt off and then wash with soap and water, and perhaps apply a little of the finish. An aniline stain cannot very well be taken out, but it may be helped somewhat with a rubber. Some of the aniline can be washed off with a regular wash, as with soap and water. Grease spots sometimes get into the leather from oil from pulleys or shafting, and may be taken with shoemaker's cement and chalk. Put the cement on first, then lay the chalk on, and work both into the leather with the flat of a knife. The cement will eat into the grease, and it should stay on until the grease comes out, even if it takes 24 hours or more.

White leather that has become soiled, may be cleansed with potassium acid oxalate. Cold water is applied to the leather, washing it all over. A mixture of salt and lemon juice or salts of sorrel, is then rubbed over the soiled portion, with the result that all the spots, stains, and dirt marks disappear, and the leather is once more white. The leather should always be washed with water, which must be rubbed over the entire skin, but

the mixture of salt and lemon juice is applied only to the soiled portion.

Rosin Soap.

2152, K. S. N., Madras.—Wants recipes of good rosin soap.

Rosin is a good cheapening agent for soft soaps owing to its forming a soap having good detergent properties. When using Rosin it is a good plan to saponify separately and then add it to the soap made from the oils. Some times soda is employed to convert the Rosin in soap, in which case the Rosin is melted over water in a steam-jacketed pan, while in another pan ordinary soda crystals are dissolved in a small quantity of water. The proportions are 5 lb of soda crystals to 112 lb. of Rosin. The soda liquor is added to the Rosin in small quantities at a time, waiting until effervescence ceases before adding a succeeding quantity of soda. After all is added the soap is boiled for a short time to finish the saponification. When this is completed the soap is run into the pan of soft soap.

As Rosin of the usual grades produces darkish-coloured soap, therefore an improvement may be effected by adopting the following method of purification. The Rosin is saponified by soda, as described above, the Rosin soap is salted out by the addition of ordinary salt and time allowed for the soap to settle. Then the lye is run off, carrying with it a large proportion of the colour-

ing matter of the Rosin. The Rosin soap thus purified may be added to the soft soap. A better grade of Rosin may also serve the purpose.

Much depends on the colour of the soft soap. The paler it is the more readily it sells. But by using Rosin the colour is considerably darkened.

Two tried recipes for soft soaps containing Rosin are given:—

(1)

	By weight.
Linseed Oil	80
Tallow	27
Rosin	10
Caustic potash lye 32 per cent.	148
Caustic soda lye 36 per cent.	8
Pearl ash	5

(2)

Linseed oil	50
Cotton seed oil	50
Rosin	10
Caustic potash lye 32 per cent.	100
Caustic soda lye 36 per cent.	29
Pearl Ash	5

The portion of Rosin to be added may be one-seventh to one-tenth that of the oils and fats used.

Glycerine From Oil.

4245 A. L. K., Banosa—Enquires how to prepare glycerine and self-shining blacking.

Glycerine may be prepared in the utmost purity by the following process. If we take equal parts of olive oil and finely ground litharge, put them into a basin with a little water, set this on a sand-bath moderately heated, and stir the mixture constantly, with the occasional addition of hot water to replace

MANUFACTURE MAGIC WIRE.

and Pharaoh's serpents under your own label by getting from us magnesium wire in oz. rolls at Rs. 13 a lb. Pharaohs serpent sticks at Rs. 7 a lb. Postage extra.

THE DARBAR TRADING & Mfg. CO.
Katra Nihal Singh, Amritsar.

what is lost by evaporation we shall obtain, in a short time, soap or plaster of lead. If after having added more water to this we remove the vessel from the fire, decant the liquor, filter it, pass sulphuretted hydrogen through it to separate the lead, then filter afresh, and concentrate the liquor as much as possible without burning, upon the sand-bath, we obtain glycerine; but what remains must be finally evaporated within the receiver of the air pump. Glycerine thus prepared is a transparent liquid, without colour or smell, and of a syrupy consistency. It has a very sweet taste. Water combines with it in all proportions.

Self-shining Blacking.

(1)

Gum arabic	4 oz.
Treacle	1½ oz.
Good Black Ink	¼ pint.
Strong vinegar	2 oz.
Rectified Spirit	1 oz.
Sweet Oil	1 oz.

Dissolve the gum in the ink, add the oil, and rub them in a mortar or shake them together for some time, until they are thoroughly united; then add the vinegar, and lastly the spirit.

(2)

Lamp Black	¾ dr.
Indigo (powdered)	1 dr.

Put them in a mortar or basin, and rub them with sufficient mucilage made by dissolving

Gum	4 oz.
in strong Vinegar	¼ pint, to form a thin paste; add very gradually of
Sweet Oil	1 oz.

and triturate until their union is complete adding towards the end the rest of the mucilage; then further add of

Treacle	1½ oz.
and afterwards, successively of	
Strong vinegar	2 oz.
Rectified Spirit	1 oz.

Finally, bottle for use.

Khair or Extract of Catechu.

2452 D. D., Razmak.—Desires to be enlightened on preparing catechu

Khair is obtained as an extract from Acacia Catechu. A "khair" tree, good for yielding catechu is known by having an abundance of red heart wood. The trees being felled the wood is cut into chips. Long shallow furnaces, with covered convex roofs are erected under sheds. The convex covering of the furnace is pierced along the centre to admit of about twenty ordinary earthen gharas being placed over the fire.

The gharas are filled with chips and water and boiled till the contents of the 20 pots will only fill two. The liquid infusion looks like thin port wine. This is set aside to cool, and the katha of catechu, coagulates and crystallises over leaves and twigs thrown into the pot for the purpose. Each pot yields about a seer of an ashy white substance. The chips of wood after the catechu has been extracted are dried and used for fuel.

The best sample of catechu are clean and whitish, or pink colour.

IMPORTANT & VALUABLE BOOKS ON GOLD & SILVER METALLURGY.

All new and for sale at reduced price.

Metallurgy of Gold Eisslen, cost Rs. 25, sale price Rs. 19. Metallurgy of Silver Eisslen, cost Rs. 12-8, Sale price Rs. 9-8. Recovering precious metals from waste Liquids Gee, cost Rs. 16, Sale price Rs. 12. Goldsmith's Hand Book Gee, cost Rs. 6, Sale price Rs. 4-8. Silver-smith's Hand Book Gee, cost Rs. 5, Sale price Rs. 3-8. Gold white, cost Rs. 3, Sale price Rs. 2. Pitman's Typewriter Manual, Sale price Rs. 3-4. S. SHILAPRIYA, P. O. Baranagore, Calcutta.

Solders for Aluminium.

2294 V. G. S. C., Madras.—Writes, how to manufacture solder for aluminium and naphthaline.

The various patented compositions of both solders and fluxes are too numerous to deal with in detail but for the most part the former are made up of aluminium tin, and zinc in varying percentages, with the occasional addition of small quantities of phosphor tin, silver, antimony, vanadium, etc. A solder commonly used consists of 80 per cent. tin, 2.25 per cent. aluminium, 17 per cent. zinc, and 0.75 per cent. phosphor tin, while another is made up of tin, aluminium cadmium and magnesium in the proportions of 85.10, 10.8, 1.35 and 2.75 per cent respectively.

The object of the flux is to dissolve with the solder without hindrance.

Clean off all dirt and grease from the surfaces with a little benzine. Apply the solder with a copper bit, and while it is still molten and covering the surface of the metal, scratch through the solder with a wire scratch brush.

Manufacture of Naphthaline.

Creosote, or heavy oil, which is a fraction of coal tar distillation obtained between 200 and 270 deg. C. contains naphthaline among other things.

For the manufacture of naphthaline this heavy oil fraction is run into shallow tanks or pans, either from the still or after the tar acids have been extracted and allowed to become cold, when the larger part of the naphthaline crystallizes. The oil is drawn off and the crystals are either shoveled into piles to drain, or are

passed through a centrifugal which leaves the crystals nearly dry and in condition for market as "drained creosote salts" or crude naphthaline.

Refining naphthaline consists in freeing it from adhering heavy oil and from unsaturated, easily oxidised compounds. The crude material should be in a coarse crystalline condition to allow of the proper extraction of the oil. If it is in a slimy state it should be recrystallised. The crystals are either washed with hot water in centrifugals, which removes the larger part of the adhering oil. After this operation the naphthaline should have a melting point of not less than 76 deg. C., and will still contain from 4 to 6 per cent of oils. The partly purified naphthalene is now distilled, to remove the tarry bodies that have been carried forward from the original tar. The distillate is kept in a melted state and run into lead lined agitators similar to those used for benzol and washed with sulphuric acid, several waters, and finally with caustic soda solution. Both the acid and soda are thoroughly removed, and the first por-

SOAP-MAKING AT HOME.

Earn a livelihood independently, add more income in spare moments. Ladies can make all kinds of Soap for home-use. A practical expert is giving out all the secrets in his practical manual. "THE SECRET OF SOAP MAKING" No technicalities.

You can prepare at a wonderfully cheap cost—Soaps like sun light soap, Laundry soaps, Glycerine soap, Phool (Floating) soaps, Coloured Scented and Toilet Soaps, Washing soaps, Carbolic and other medicated soaps.

Animal fat is not Required.

Every body can make any quantity—from one pound to cwts.—easily and quickly for home-use or for the market. Price Rs. 4 only. Price Rs. 4, only by M. O. No. V. P. is sent.

THE HINDUSTAN SOAP WORKS.

(Publishing Dept. No. 1) Nawashehar, Jullundur.

tion and last portion of the distillate rejected. The water white refined raphthaline is run into shallow pans to cool, when it can be broken up and sold as lump, or is run into copper tanks heated by steam, from which it is available for casting into balls, etc. Or for use in the subliming pans.

Silver Copper Nickel Alloy.

2203 S. N. S., Amritsar.—Wants to learn about silver copper nickel alloy.

Nickel alone makes silver very hard and brittle, such alloys being difficult to work into utensils, but by adding some copper the alloys can be cast, rolled, and fused, and the articles manufactured from them are harder than those from silver and copper alloys. Alloys of silver, nickel and copper are much used by French manufacturers for articles formerly prepared from standard silver. These compositions may be considered as an argentan whose properties have been improved by adding silver.

Indian Sarsaparilla.

2211 A. R. K. S., Chanda.—Asks how can *anantmul* be administered?

Hemidesmus Root or Indian sarsaparilla is known in Bengalee as *Anantmul*. It is best given in the form of Infusion, prepared by infusing one ounce of the bruised roots in half a pint of boiling water in a covered vessel for an hour and straining. Of this the dose is from 2 to 3 oz thrice daily. Its efficacy is much increased by being taken while the Infusion is still warm, the addition of milk and sugar renders it so like ordinary tea that children will take it readily. It is useful in Rheumatism, syphilis, Indigestion, etc.

Rasaut from Barberry.

2357 S. B., Dalhousie.—How can Rasaut be prepared from Barberry.

What is known as Rasaut is an impure watery extract of barberry bark and wood. This can be purified by dissolving it in proof spirit and then evaporating to the consistence of treacle.

Barberry bark may also be administered in the form decoction.

Chopped or coarsely powdered root, 6 oz.; water 2½ pints. Boil and slowly and reduce to 1 pint.

Bleaching Oil.

2385 K. V. C., Madras.—Enquires how oil is bleached.

The oil is first agitated with water containing gum, and to the emulsion thus formed is added coarsely crushed wood charcoal; the whole is then slowly warmed to a degree not reaching 212 deg. F. and when cold the oil is dissolved out by ether or petroleum spirits, and the latter is recovered by distillation; the result is good.

THE ONLY TIME TO ENCOURAGE. SWADESHI INDUSTRY.



Purchase KIRLOSKAR PUMPS.

Write for full particulars to Sole Agents—for India, Ceylon, etc.

K. B. JOSHI & CO.,

321, Hornby Road, Fort Bombay,
Post Box No. 534.

Calcutta—84A, Clive St., Post Box
No. 675.

Karachi—Bunder Road, Post Box
No. 230.

Madras—Post Box No. 1260.

Note.—All kinds of Myers Pumps
as shown in the block can be
had of us at moderate prices.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

2112. G. P. M. Bara Banki.—Pencil-cigarette lighter may be bought of The Union Trading Co., 166, Harrison Road, Calcutta. Dating stamps may be had of B. N. Bysack, 1/1, Ram Chand Ghose Lane, P.O. Beadon St., Calcutta. Sex indicator may be supplied by Radhu & Co., 77/1, Lower Circular Road, Calcutta.

2113. S. G., Garhi.—Mustard oil will not be suitable for manufacturing soap. It is very difficult to say which firm will take oil from you. For this purpose you should advertise in the pages of newspapers and periodicals.

2114. D. D. H., Simla.—Optical goods may be bought of Stephens & Co. Ltd., 275, Bow Bazar Street, Calcutta. Collapsible tubes may be supplied by Venesta Ltd., Great Tower St., London, E. C. 3, and Brooks Peel & Co. Ltd., 24 City Road, London E. C. 1. Calendars are printed by Calendar Mfg. Co., 62-66, Meadows St., Fort, Bombay and Mohila Press, 31, Pataldanga Street, Calcutta. For medical books enquire of Butterworth & Co., Hastings Street, Calcutta.

2115. I. I. B., Dehra Dun.—Chemicals may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, D. Waldie & Co., 1, British Indian St., Bengal Chemical & Pharmaceutical Works Ltd., 15, College Sq., Calcutta Chemical Co., 35/1, Panditia Road, Ballygunge and Oriental Industrial Co., 9, Bonfields Lane, all of Calcutta. Scientific apparatuses may be supplied by Bengal Scientific Supplies Co., 29-32, College Street Market, Calcutta. For stationery goods refer to No. 2106 above.

2116. J. M. N. K., Fatehgarh.—Typewriters of various sorts may be supplied by Aryan Typewriting Co., Girgaum Tram Terminus, Bombay No. 4. Wants to know the address of Mosul Oil Co., at Calcutta.

2118. K. C. M. B. Shikarpur.—Refer to No. 1976 above.

2119. J. A. P. A., Trivandrum.—Wants to buy wick used in candles. Process of manufacturing bisulphate of quinine will appear in an early issue.

2120. G. V. S., Ahmedabad.—There is no institute in India where glass industry is taught. For a complete list of glass manufacturers consult Thacker's Indian Directory. For the present you may correspond with Calcutta Glass and Silicate Works Ltd., Belgatchia, Calcutta; Bengal Glass Works, 55, Canning St., Calcutta and Naini Glass Works, 235, Bahadurganj, Allahabad. Knitting machines may be supplied by Economit Hosiery Mills Ltd., 50/2, Dharamtala St., and W. H. Brady & Co., 26, Strand Road; both of Calcutta.

2121. M. M. G. S., Mandalay.—Enquiries in our Trade Enquiry columns are published only once.

2122. S. V. S., Singareni.—You may go through Poultry Keeping in India by Mrs. Isa Tweed. For training in poultry keeping write to Govt. Poultry Farm, Etawah.

2123 T. N. Bhimavaram—Steel trunks may be supplied by Arya Factory, 15, Paymental Garden Lane, Tangra and Laukhi Agency, 73, Harrison Road; both of Calcutta. Cycles may be supplied by B. S. A. Cycles Ltd., 20-28 Pall Mall, London E. W. 1; Raleigh Cycle Co. Ltd., 41, Holborn Viaduct, London E. C. 1; Hebran O. S. W., Grassburenstrasse, Berlin, Germany; Act Ges. Vorm. Scidel & Naumann, Hamburgerstrasse 19, Dresden, Germany; Excelsor Cycle Stores, 5340 Broadway, Chicago, Illinois, U. S. A. and National Cycle and Manufacturing Co., Bay City, Michigan, U. S. A.; Leduc Pere & Cie., Chatillansur, Seine, France and Terrot & Co., Degon, France.

2126 J. G., Rajanmundry—Aleppo gall nuts may be supplied by S. N. De, P. O. Box 7851, Calcutta. Sulphate of indigo may be bought of

B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. Tins may be bought of Calcutta Mineral Supply Co., 31, Jackson Lane, Calcutta.

2127 C. M. B. R., Campbellpur—Japanese buttons may be bought of Volkart Brös, Karachi.

2130 D. R. L. Raikot—It would appear that you have studied the watch problem too closely. We do not think it will be easy for you to secure the services of an expert who could throw further light on the subject. Such a person can possibly be found in the trade only. The manufacture of collapsible tube will require an investment of a large capital. The unemployment problem of the middle classes has been dealt with elsewhere in this issue.

2135 V. M. S., Surat—For particulars regarding journalism examination in U. S. A. write to Hindusthan Association, 116 West 39th Street, New York City, U. S. A.

2137 N. K. S., Calcutta—For explanation of commercial terms you are referred to No 183 under Questions and Answers column in October 1925 issue of **Commercial India**.

2139 A. N., Bangalore—Chemicals may be bought of B. K. Paul & Co., 1-3 Bonfields Lane; Bengal Chemical & Pharmaceutical Works Ltd., 15, College Sqr. and D. Waldie & Co., 1, British Indian Street; all of Calcutta. For books on photography write to S. Govind & Co., Bombay 4.

2141 J. A. D. S., Goa—For securing agencies of goods mentioned by you go through the advertising pages of **Industry**.

2142 V. P., Madura—Cookers may be bought of Ie-mic Cooker, 29 College Street, Calcutta; Annapurna Cooker Co., P.O. Thalakhadi, Relief Cooker, 70 College Street, Calcutta; Rukmani Cooker Co., Rayapuram, Madras and Belgaum, M. S. M. Ry.

2143 T. K. S., Arumbakkam—An article on manure appeared in April 1925 issue. For manures write to Chilean Nitrate Committee, Post Box 469, Calcutta.

2145 S. R. G., Raghak—Your enquiries appeared in the last issue.

2146 M. M. A., Ersama—Guns may be bought of Escofally Mahomedally & Co., 78

Bhusari Mohalla, Crawford Market, Bombay; K. C. Biswas & Co., 1 Chowringhee Road, Calcutta; A. Hajee Dossal & Sons, Elphinstone Street, Karachi and Oakes & Co., Ltd., 200 Mount Road, Madras. Dhoties may be supplied by Haribux Durga Prasad, 61 Cross Street; Chunilal Sewchand Roy, 152 Cross Street and Dhansukh Das Jethmul, 178 Harrison Road; all of Calcutta. Bangles may be supplied by F. P. Nalladaroo & Co., 50/1, Canning Street and S. Abdul Aziz, 52 Canning Street; both of Calcutta.

2148 K. S. V. N., Pudukotah—For fancy label printing write to the Calcutta Fine Art Cottage, 76, Dharamtala Street, Calcutta.

2149 D. S. M., Bombay—Your enquiry being in the nature of an advertisement should not be published in these columns.

2150 A. P., Bombay—Wants to be put in touch with egg dealers of Chittagong.

2151 M. M. S., Colombo—Wants tobacco for "Hookah" of superior quality.

2152 K. S. N., Madras—In distilling rosin a bright oil first comes over, and with it some acetic acid and water. As soon as a cessation in the flow of the distillate occurs the receiver is changed and the heat is raised, when a red-coloured and heavy rosin oil comes over. The red oil is boiled for a day with water, the evaporated water being returned to the vessel; next day the water is drawn off, and the remaining rosin oil is saponified with caustic soda lye of 36 Baume, and the resulting solid mass is distilled so long as oil passes over. The product obtained is rectified rosin oil which is allowed to stand in iron vessels, protected by a thin layer of gypsum, whereby after a few weeks a perfectly clear oil is obtained free from water. The apparatus used

ONE OF THE LEADING HOUSES IN INDIA

for STATIONERY & PAPER.

High Class goods and cheapest rates.

TRIAL SOLICITED.

KAMRUDDIN MOHOMUD UMAR,

"Osman Manzil"

1st Agiary Lane, Bombay 3.

Wanted Foreign Connections. Correspondence invited.

consists of an iron pot, a headpiece, a condensing arrangement and a receiver. Artificial benzoin is not generally prepared. At Bombay assafoetida is adulterated with some other things. • For preparing sticking plaster take insinglass 1 part; water 10 parts, dissolve, strain the solution and gradually add to it of tincture of benzoin 2 parts; apply this mixture, gently warmed by means of a camelhair brush, to the surface of silk or sarcenet stretched on a frame and allow each cooling to dry before applying the next one, the application being repeated as often as necessary; lastly give the prepared surface a coating of tincture of benzoin or tincture of balsam of peru. Some manufacturers apply this to the unprepared side of the plaster, and others add to the tincture a few drops of essence of ambergris or essence of musk. Oil of tartar is deliquesced carbonate of potash. Recipe of rosin soap appears elsewhere in this issue. An article on printing ink manufacture will appear in an early issue.

2153. V. M. S., Cherrapunji—Wants to be put in touch with dealers in coral beads.

2154 R. J. S., Kolhapur—For cold storage plants write to Indian Lightfoot Refrigerating Ltd., Belliaghata Main Road, Calcutta who will supply you with all the necessary information and literature.

2155 A. S., Kandukur—You are referred to an article on Avenues of Employment that appeared in January 1922 issue of **Industry**.

2156 P. L., Ralangi—Swan pens may be supplied by Mabie Todd & Co. Ltd., Swan House, 135 & 135 Oxford Street, London W1. Wants to be put in touch with the agent of John Dicks, Effingham House, Arundal Street, Strand, London W. C.

2157 P. K., Matunga—Refer your query to the Education Department of your province.

WANTED.

Booksellers and Agents to conduct the sale of our Universally demanded book "Control over Birth" (Price Re. 1-4) at a high rate of discount. Bonafide dealers can get a sample copy on sending stamps worth 7 as. For terms write

BRIJMOHAN & CO.

Katra Nihal Singh, Amritsar.

2158 M. P. L., Maungdaw—For cleaning cloths with less labour you may try Klenzol to be had of Andheri Industrials, Andheri, Bombay. Process of preparing vinegar from molasses appeared in July 1923 issue.

2159 A. N., Bombay—Weighing scales may be supplied by Bruno-Pfeiler, Liegnitz 20, Germany.

2160 C. H. L., Lumding—Glasswares may be bought of Bengal Glass Works, 39/1, Canning Street; Nando Lall Das & Bros, 194 Old Chinabazar Street and Satya Charan Paul & Sons, 194, Old Chinabazar Street; all of Calcutta.

2161 F. R. C., Bombay—Fish oil may be deodorised but process is very complex and at the same time costly requiring many machineries and plants. But the process of refining usually consists in demargarinating and then filtering the clear oil through charcoal to bleach. Occasionally a treatment with concentrated soda lye to remove free fatty acid and improve the colour is conducted.

2162 K. C. K. I. Saidapet—Recipes of safety matches will be found in September 1923 issue and formula of toilet soap appeared in April 1925 issue.

2163 P. N., Sullia—It is not possible to manufacture rectified spirit from methylated spirit. An article on spirit manufacture will appear in an early issue. You are referred to the article on Chemical Utilisation of Wood that appeared in September 1925 issue.

2164 P. G. T. C., Gujranwala—For dealing in wine you will have to take license and you will have to give required duty. Mantles may be bought of Fani Bhusan Kundu, 85, Harrison Road; Haridhon Daw, 72/73, Old China Bazar Street; Surendra Nath Paul, 186 Old China Bazar Street; all of Calcutta.

2165 V. P., Ellore—You perhaps mean Industrial and Trade Review for Asia, Reichstrasse 104, Berlin-Charlottenburg, Germany.

2166 I. S. R., Bangalore—Refer to No. 1856 in the November 1925 issue.

2167 J. F. C., Castle Rock—For price list of cream separators write direct to P. Lodge & Co., P. O. Box 6772, Calcutta.

2168 H. J. J., Akola—Calcutta agent for Chevrolet is Allenburry & Co., 24 Park Street.

2169 D. D., Delhi—The Ramayana has not been translated into Urdu. Urdu translation of Vrigu Samhita is not available. It is not possible to utilise waste pieces of shawl in making new ones. Your other queries are not in our line. For matrimonial information you may correspond with various matrimonial bureaus names of which appear regularly in the pages of dailies and weeklies.

2170 B. G. B., Panna—Emerald may be bought of Benode Behari Dutt, Mercantile Bldg. 1, Bentinck Street, Calcutta. For photographic goods enquire of Calcutta Camera House, Chowringee, Calcutta.

2171 T. V. N. I., Palni—Process of peppermint preparations appeared in July 1924 and February 1925 issues of **Industry**.

2172 R. S. A., Tuticorin—Envelope making machines may be had of Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta. For home print of Tamil character write to S. C. Dutt & B. K. Dutta, 100 Durga Charan Mitter Street, Calcutta.

2173 K. C. M. S., Salem—For commercial map of India write to Central Book Depot, 7 Hastings Street, Calcutta. Indian Market Report has ceased publication. Ice plants may be supplied by Burn & Co., 7 Hastings Street, Calcutta. Can supply groundnut husk. To communicate with any querist write him with name and number under care of **Industry** when your letter will be duly redirected.

2174 M.A., Nuzvid—Arms and ammunitions may be bought of K. C. Biswas & Sons, Chowringhee, Calcutta. Fire Works may be had of Oriental Fire Works, 85/1, Upper Circular Road, Calcutta.

2175 S. C. M., Bangalore—Your queries are unintelligible.

2177. M. G. A., Kasauli—Recipes of pain balm appeared in October 1921 issue. Process of copper plating appeared in November 1923 issue.

2178 H. R. S., Bettadapura—Process of rubber stamp making appeared in January 1924 issue. An article on boot polish manufacture

appeared in June 1923 issue. Recipes of safety match composition appeared in September 1923 issue. An article on ink manufacture appeared in November 1922 issue. Process of preparing peppermint tablet will be found in February, 1925 issue. Recipes of syrup hypophosphate of lime appeared in June 1922 issue. Your other enquiries are receiving our attention.

2180 S. A. Hamid, C/o. P. O. Box 118, Kampala, Uganda—Laundry machinery may be supplied by Highbury Machine Co. Ltd., 140, Holloway Road, London N.7.

2181 M. L. S., Vizagapatam—Full address of Mobie Todd & Co., Ltd. is Swan House, 133 & 135 Oxford Street, London W1; that of Vinolia Company Ltd., is St. Stephen's House, 2 Coleman Street, London E C 2; that of The U. S. Playing Card Co. is Cincinnati, Ohio, U. S. A., and the Calcutta address of Nestle & Anglo-Swiss condensed Milk Co. is 4 Garstin Place. Other addresses are not known.

2182 V. N. K. M., Turuvekere—The following are some of the cotton mills of Bombay: Alliance Cotton Mfg. Co. Ltd., 73 Apollo Street; Bombay United Spinning and Weaving Co. Ltd., Oriental Bldgs. Fort; Bombay Dyeing & Mfg. Co. Ltd., Forbes Bldgs, Home Street; Central India Spinning Weaving & Mfg., Co. Ltd., York Bldgs, Hornby Road, Coronation Mills Co. Ltd., 51 Apollo Street and Crescent Mills Co. Ltd., 137 Esplanade Road.

Kaminia-Oil.

Used by all nations for preserving and beautifying the hair and keeping the head cool and brain refreshed. Rs. 1-4 per bottle.

(Registered)

**TRY IT ONCE.
SOLD EVERYWHERE.**

2184 P. C. S., Jalpaiguri—Cinema apparatuses may be supplied by Kino-Market, G. m. b. H., Fried-Richstrasse 14, Berlin S. W. 48 and Grass & Worff, Markgrafenstrasse 18, Berlin S. W. 68; both of Germany. Electric plants may be supplied by Berliner Elektrizitats G. m. b. H., All-Moabit 73, Berlin N.; Wand Elektrische Zentralen G. m. b. H., Spandan, Berlin; both of Germany. Scientific apparatus may be supplied by Oskar Bottcher, Bulowstrasse 56, Berlin 7 and Medizinisches Warenhaus A.-G., Karlstrasse 31, Berlin N. W. 6; both of Germany.

2185 J. A. D., Goa—For the medicine and yeast enquire of B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta.

2187 H., Manzai—You may learn tailoring at Calcutta Commercial Institute, College Street Market, Calcutta.

2188 P. L. S., Laskhar—Your enquiry is receiving our attention.

2189 H. P. P., Kathiawar—Waste rubber cannot be melted. India rubber may be bought of Bhoot Nath Mukherjee & Co., 12 Raja Woodmunt Street and Gopal Chandra Dass & Co., 74/1, Clive Street; both of Calcutta. For sharpening knife pen you may retemper it or you may use sharpening tools available in the market.

2190 S. P. W., Kurunegala—Printing types may be bought of Stringertype Manufacturing Co. Ltd., 44 to 46 Leadenhall Street, London E. C. 3; Universal Typecasting Co. Ltd., 1 Catherine Street, City Road, London E.C.2 and Blackfriars Type Foundry Ltd., 154, 155 & 156 Blackfriars Road, London S.E.1. Typecasting machines may be supplied by Kerr George Frier, Canterbury Works, Canterbury Terrace, London N1. Printing blocks may be supplied by N. Thomas Lawrence, 4, Red Lion Passage, Fleet Street, London E.C.4.

2194 M. B., Cawnpore—Indian herbs are exported by S. N. De, P.O. 7851, Calcutta. Wants to be put in touch with exporters of frog.

2196 M. N. S., Tadepalligudem—Thread balling machines may be bought of Oriental

Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

2197 B. L. S., Almora—You may learn mechanical engineering at Bengal Engineering College, Sibpur, Howrah and Bengal Technical Institute, Jadabpur, Dhakuria, 24-Parganas.

2198 M. L. H., Nathawara—Collapsible tubes may be supplied by Brooks Peel & Co. Ltd., 24 City Road, London E.C.1 and Venesta Ltd., 1 Great Tower Street, London E.C.3.

2199 P. N. Jullundur City—For all the addresses of general merchants consult Thacker's Indian Directory.

2201 S. A., Aurangabad—The claimed increased production of butter by adding a proportionate quantity of alum to milk has been found unworkable.

2202 K. T. B., Bhiwride—Starch is manufactured by Sectarampore Starch Co. Ltd., Mfg. Ag. Lyall Marshall & Co., 25 Mangoe Lane, Calcutta. In red boot polish you may use Bismark red. Process of preparing starch will be found in April 1924 issue.

2204 S. N. H. L., Najibabad—For hair oils you may go through the booklet on Manufacture of Hair Oils published from this office. For soap making you may go through Manufacture of Soap by George H. Hurst. Industrial books may be bought of Chackraverty Chatterjee & Co. Ltd., 15 College Sqr., Calcutta.

2206 I. D. M., Peshawar—Castor oil may be bought of Mathansethy Krishna Rao, Bez-wada; Rose & Co., P. O. Box No. 30, Cocanada and Vupputury Narisimhamson & Co., Guntur.

2207 S. S. C., Dhamtari—For lead tubes enquire of Venesta Ltd., 4 Mangoe Lane, and B. K. Paul & Co., 1-3 Bonfields Lane; both of Calcutta.

SETT DEY & Co

ORIGINAL HOMEOPHARMACISTS,

42, Strand Road, Calcutta.

Dealers in Original Homoeopathic dilutions and Biochemic Triturations.

Catalogue Free on Application.

2209 D. R. N., Vizianagram—Process of preparing yeast appeared in November, 1925 issue.

2210 G. C., Kaimganj—Write clearly your doubts and difficulties when we shall forward these to the experts for proper solution and the result will be duly communicated to you.

2212 J. M. S., Bhagwangola—Wants to sell vermicelli. You may learn motor engineering and driving at French Motor Car Co, Ltd, 234-3 Lower Circular Road, Calcutta. You may go through Indian Agricultural Journal to be had of Thacker Spink & Co., 3 Esplanade East, Calcutta. For particular of Kancharapara Workshop write direct to the Loco Superintendent. For industrial books enquire of Chackraverty Chatterjee & Co. Ltd, 15, College Sqr. Calcutta

2213 K. N., Madras—Swimming belts may be had of Carr & Mahalanobis, Chowringhee, Calcutta and Mohantosh Bros, 15 College Sqr. Calcutta.

2215 B. T., Tangail—Clover grass grows very luxuriantly and serves as a fodder for cattle. So you may sow these in your land. Clover seeds may be bought of Suttan & Co, Park Street, Calcutta.

2216 M. N. R., Chandernagore—Minium is a kind of red lead obtained by exposing lead or protoxide to heat, till it is converted to a red oxide. It may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. Rock crystal is native crystallised silica. It may be had of Williamson & Co., Oldham Road, Gaya.

2218 M. N. B., Calcutta—Violin and its accessories, may be supplied by Gebruder Schuster, Marknenkirchen 161, Saxony; Amman Glaser, Erlbach, Vogtland; Lippold Hammig, Marknenkirchen 276 and Richard Gommert, Marknenkirchen, Saxony; all of Germany.

2219 T. V. R. S., Negapatam—Enamel wares are manufactured by Bengal Enamel Works Ltd., 55 Canning Street and Pioneer Enamel & Iron Works, 82 Colootola Street; both of Calcutta. Machinery for manufacturing enamel ware may be supplied by Crossley Machine Co., Tenton, New Jersey and Eagle Iron Works, Des Moines, Iowa; both of U. S. A.

About two to three lakhs of rupees will be required for starting a factory for manufacturing enamel wares.

2221 K. C. M., Mymensingh—In the face of foreign competition of cheap sugar it does not seem profitable now to start new sugar industry.

2223 J. F. C., Nova Goa—Incubators may be bought of W. Leslie & Co., 16 Chowringhee, Calcutta. Cream separators may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street and P. Lodge & Co., P.O. Box 6772; both of Calcutta.

2226 K. A. D., Tumsar—For industrial books enquire of Thacker Spink & Co, 3 Esplanade East, Calcutta

2227 U. T. H., Quetta—Chemical apparatus may be supplied by Scientific Supplies Co, 29-32 College Street Market, Calcutta.

2228 L. M. Russellkonda—Yarns are dyed at Mysore Dyeing & Bleaching Works, Mysore. You may learn dyeing at Serampore Govt. Weaving Institute, Serampore, Howrah. Dyeing colour and chemicals may be had of Calcutta Chemical Co, 35/1, Panditia Road, Ballygunge, Calcutta. German dyes may be had of Aminchand Mehra & Sons, 34 Armenian Street, Calcutta.

2229 P. A. S., Calcutta—Mosaic tiles may be bought of B. N. Roy & Sons, 13 Jackson Street and Gladstone Wyllie & Co., 5 Council House Street; both of Calcutta

BOMBAY DESHI OUSHADHALAYA.

Factory & Dispensary.

ASK FOR ANY FEVER.

Ague Killer.

1 Phial As. 8.

Doz. Rs. 5.

and our other popular remedies.

Can be had everywhere at

Cheapest Rate.

**PEARL & CO., Victoria Garden,
BOMBAY.**

2232 P. G. R., Nidadavole—Cement will not be of any use for soldering cracks of oil engines. You will have to weld it again.

2233 P. G., Madras—An article on match manufacture appeared in July 1922 issue. Recipes of match composition appeared in September 1923 issue.

2273 S. R. R., Posupati Raiga—Please refer to the article on unemployment that appears elsewhere in this issue.

2238 B. D., Budaun—You may learn dentistry at The Calcutta Dental College and Hospital, 261 Bowbazar Street, Calcutta.

2241 J. M. N. K., Kaimganj—You may consult Ubersee Post, 10 Solomanstrasse, Leipzig, Germany; Empire Mail, 212 High Holborn, London W.C.1; Commercial Osaka published by the Osaka Commercial Museum, Osaka, Japan and Commerce Monthly published by the National Bank of Commerce, New York, U. S. A. For registration you may write to P. Lodge & Co., P.O. Box 6772, Calcutta. Remington and Yost typewriters may be supplied by Remington Typewriter Co. Ltd., 31, Council House Street, Calcutta. For agency of the Kerosene Company write direct to the company at Mosal. For Derby lottery tickets write to the Secretary, Royal Calcutta Turf Club, 13 Russel Street, Calcutta.

2242 Q. A. M., Allahabad—For rapid sale of articles manufactured by you advertise in pages of news papers and periodicals.

2244 L. D. S., Jhalrapatan—Process of extracting poppy seed oil will appear in an early issue.

2245 S. R. R. T., Srirangam—Storage accumulators for house-lighting purposes may be supplied by Russa Engineering Works Ltd, 110/1, Russa Road, Calcutta. Electric bulb may be bought of Mc Lawrie & Co., 17 Ezra Street, Calcutta.

2246 G. S., Kotah—Homeopathic medicines may be had of G. K. Nag & Co., 297 Upper Chitpur Road and N. K. Mazumdar & Co., 34A, Clive Street; both of Calcutta.

2247 P. N. S., Chicacole—Cameras may be bought of Calcutta Camera House, Chowringhee, Calcutta. Rice huller may be supplied by Marshall Sons & Co., 99 Clive Street, Calcutta. Wants to buy, imitation diamond.

2250 T. M. Y., Madras—Your enquiry being in the nature of an advertisement should not be published in these columns.

2252 J. P. G., Aligarh—Eastern Motors published from British Indian Street, Calcutta, is perhaps the only paper on motor in India. Your other queries being in the nature of advertisements should not be published in these columns.

2253 S. V. R. M., Tadepalligudem—Wants to buy a secondhand cornish Boiler of 18-24 N. H. P.

2255 S. A. G., Rangoon—Guts may be supplied by M. A. Sirkar & Bros, Sialkot, Punjab, Edward Charles & Sons, 41 Cowcross Street, London E.C.1; L. & R. Leymans, 69 St. John Street, London E. C. and East Arthur & Co., Little Cornards, Sudbury Suffolk, England.

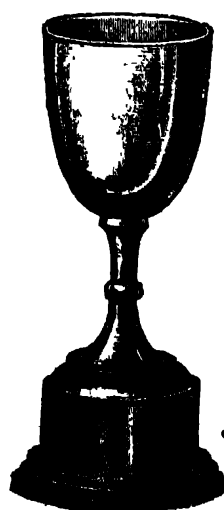
2258 W. H. J. J., Colombo—Gas burners, etc. may be had of Hiralal Dey & Co., 144 Harrison Road, Calcutta and R. Patel & Co., Opp. High Court, Madras.

2259 N. R. Naban—For market quotations of the Bombay and Karachi write to the Chambers of Commerce of those places.

2262 K. L. K., Rajputana—It is not possible to change the taste of soil water.

2263 R. I. W., Wazirabad—Process of softening horns appeared in September 1921, issue.

2266 A. W. K., Madura—Lamp wick making machines may be bought of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta. Your other query is engaging our attention.



**Cheapest House For
Sporting Goods
Silver Medals, Cups &
Shields.**

**Fine Silver Medals in
Velvet lined cases.**

Rs. 3-12 each.

Largest Stock & Variety.

Illustrated lists free.

**CARR & MAHALANOBIS,
Chowringhee Corner, Calcutta**

2267 B. K. S., Gulbarga—Printing machines may be bought of Ashutosh. Auddy & Co., 16 Lower Chitpur Road and John Dickinson & Co., Commercial Bldg., 1 Bentinck Street, Calcutta.

2268 P. M., Baroda City—For manufacturing pencil you will have to read some books on the subject which may be supplied by Chackraverty Chatterjee & Co. Ltd., 15 College Sqr., Calcutta. Process of preparing chalk crayons appeared in February, 1924 issue. 95 per cent. soda means that there must be 95 parts pure soda in 100 parts soda used. Process of preparing soap lye appeared in August 1922 issue. Process of extracting glycerine from soap lye will be found in July 1922 issue.

2269 G. T. N., Pudukkottai—Wants to be put in touch with fruit merchants of Bombay, Calcutta, Madras, Nilgris, Salem, Trichinopoly and Bangalore.

2270 D. S. S., Chicacole—Celluloid rings may be bought of Mohomedally Jaferjee, 37-4 and 37-5 Canning Street, Calcutta and G. Otomune, 130 Junkeima Sanhome, Osaka, Japan.

2271 D. J., Alleppey—For prospectus of mining institute you may write to the Principal, Bengal Engineering College Shibpur, Howrah.

2272 P. S., Walajapet—The book you require may be had of Thacker Spink & Co., 3 Esplanade East, Calcutta.

2273 D. M., Chittagong—Silk may be supplied by Kasai Bros, P.O. Box 120, Kobe, Japan; Home Industries Association, Kamakhya, Gauhati, Assam; Pohoomul Bros, 33 Canning Street, Calcutta and Butamall Omparkash Jearatna, Basti Guzan, Jullundur.

2274 M. D. D., Bina—To communicate with any querist write him with name and number under care of **Industry** when your letters will be duly redirected.

2275 S. R. S., Kottar—For transferring prints to wood surfaces should be rubbed smooth with decolourised linseed oil, then dried over a coal fire and given 3 coats, one after another, of a varnish made of 30 parts of sandarac, 15 parts shellac, 15 parts turpentine and 375 parts of alcohol. The varnish may be coloured at discretion with dragon's blood,

turmeric, etc. The engraving to be transferred is thoroughly soaked in salt water and spread on blotting paper, remaining moist. A smooth board as hot as possible and screw clamps must be all ready. The wood surface must be again coated with varnish, also the picture on the printed side. It must then be laid smoothly on the wood surface, over it a piece of flannel and on that the heated board and the whole pressed lightly together by means of the screw clamps. After a few hours it will be dry. Rub the back of the picture with linen rags, wet with water, until the greater part of the paper is rubbed off, cover the surface with linseed oil and rub off any part of the paper that remains with the finger. The picture surface can then be rubbed down with linseed oil and linen rags, dried, the surface varnishing repeated 10 times and finally given a coat of copal varnish and polished. For learning block making write to the Principal, Government School of Art, 28 Chowringhee, Calcutta.

2278 A. V. I., Bombay—Rubber stamp making appliances may be bought of B. N. Bysack, 1/1, Ramchand Ghose Lane, P.O. Beadon Street, Calcutta.

2279 C. P. A. M., Coimbatore—Chemicals may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

2281 S. S. R. S. Amritsar—Composition of Chinese blue appeared in January 1925 issue.

2282 G. N. R., Nova Goa—Process of manufacturing celluloid appeared in August 1923 issue. An article on electroplating will be found in November 1923 issue of **Industry**.

2283 S. N. B., Kapurthala—You may consult Gana Nath Sen, Kalpataru Ayurveda Bhavan, Grey Street, Calcutta.

LIMITATION OF FAMILY.

Third Ed. 5 Portraits, 55, Engravings.
357 Pages, Price Rs. 3. Postage Extra.

A comprehensive and Confidential Treatise of children according to his health and means Every parent desiring to regulate the number will find it a God-send. Ask for table of detailed contents which will be sent free.

K. M. DAS & CO.,
29-1, Telepara, Sampooker St., Calcutta.

2284 S. M. C, Saharanpur.—Wants to be put in touch with dealers in waste piece-goods.

2285 F. B., Secunderabad.—Desires to be put in touch with dealers in rice, wheat, dal, cotton seed, gram, ghee, til oil, jaggery, maize, corn, etc.

2286 D Dacca.—The properties of the indigenous drugs mentioned by you can be ascertained from local Ayurvedic Physicians

2287 B S, Guntur.—Sign plates are enamelled by Bengal Enamel Works Ltd, 55 Canning Street, Calcutta.

2285 K M. Y, Bombay.—Letters received in response to your enquiry will be duly redirected to you.

2289 M. P, Ettumanoor.—Your previous letter is not traceable: repeat your queries

2290 A S, Poona.—Cigars may be bought of General Tobacco Co, 72, Merchant Street and Fatimah & Sons, Cigar stores, 258 Phyre Street; both of Rangoon

2291 S. M. T. M C, Negapatam.—Please mention clearly in what particular article you wish to deal.

2292 K K. C S, Sholinghur.—Sewing thread may be bought of Gulamhussein Bondeally Heerji, 54 Canning Street, and Hajee Ismail Sait & Sons, 55 Canning Street; both of Calcutta. Stationery goods may be supplied by Nilmoney Haldar & Co., 106 Radha Bazar Street, Calcutta.

2293 M. C., Hinganghat.—It is not possible to melt iron by chemical process only

2295 J. N. B, Calcutta.—You may write to the Calcutta Advertising Agency, 15 College Sqr. For the machinery required write to the Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta. Your idea of starting an advertising agency is a good one.

2296 A. R. P., Ramnad.—For proper adjustment of illustrations in books and for preparing blocks you will have, to read books on the subjects which may be supplied by Thacker Spink & Co., 3 Esplanade East, Calcutta.

2297 N. K. R., Madras.—For disposing of pickles you may correspond with the following provision merchants of London:—Brand & Co. Ltd, 72-84 South Lambeth Road, S. W. 8; McLean & Lawrenson, 62 Holborn Viaduct E.C.1 and Williamson & Co., Cross Lane, East Cheap, E C 3

2298 A P. C., Rangoon.—It not suitable to mercerise cotton piece-goods. Cotton yarn is generally mercerised. The process of mercerising cotton yarn appeared in July 1925 issue.

229 P L, Ralangi.—Wants to know the present address of Oxypathor Co. Will some reader communicate to him the required address.

2300 S. A A, Gaya.—Consult a physician.

2304 J. R, Ghoramara.—Process of making looking glasses appears elsewhere in this issue.

2305 G P. R, Guntur.—There are many technical institutes in India, hence it is not possible to publish a list of all technical institutions in India. You may however communicate with the heads of The College of Engineering, Madras; The Government School of Art, Madras; Agricultural College, Coimbatore and Wesleyan Mission Industrial School, Karrur. It will be advisable for you to write to the Director of Industries of your province.

2306 T. S. M, Talavapuram.—Storing sound on steel by electromagnetic wire is still in its experimental stage. Telescopes and periscopes may be bought of Lawrence & Mayo, 16 Old Court House Street and Stephens & Co. Ltd, 275 Bowbazar Street, both of Calcutta.

2308 R. N., Alwar.—Wire drawing machinery may be supplied by Standard Machinery Co., Anburn, Rhodes Island and Morgan Construction Co., Worcester, Massachusetts; both of U. S. A. Sheet metal working machines may be supplied by Taylor & Challen, Birmingham, England; Niagara Machine and Tool-Works, Buffalo; E. W. Bliss Co., Brooklyn, New York and Baird Machine Co., Bridgeport, Connecticut; last three of U. S. A.

FREE! FREE!! FREE!!!

Creosoted TOOTH POWDER.

'Antiseptic & Fragrant.

Cures gum & dental diseases. Rs. 2/- per doz. One tooth brush free.

ANANDMOYEE CHEMICAL WORKS.

Krishnagar, Bengal.

2310 J. S., Wasu.—You may consult Nipun Vyapari published from Delhi.

2311 P. N. G., Kanchrapara.—For getting an early reply you may write to the advertiser attaching self-addressed envelopes. Your letter has already been redirected.

2312 A. P. C., Rangoon.—Ginning machines may be supplied by H. M. Mehta & Co., 123 Esplanade Road, Fort, Bombay.

2313 M. L., Ludhiana.—For the address required you may go through the civil list of South Africa.

2314 P. S., Nawabgunj.—You may write to the Principal Bengal Engineering College, Shibpur, Howrah and Superintendent, Bengal Technical Institute, Jadabpur, Dhakuria, 24-Parganas for prospectus.

2315 C. S. M., Salem.—Hydraulic press for crushing and extracting oil from oil seeds may be supplied by Burn & Co., 7 Hastings Street, Calcutta. Ordinary process of deodorisation of oil is applicable to groundnut oil. For this purpose you may consult April 1922 issue.

2316 A. R. S., Kangra.—Sodium silicate is not used for glazing pottery.

2318 T. B., Ambala City.—Watches and clocks may be supplied by Hamilton Watch Co., Lancaster, Pennsylvania, U. S. A.; New Haven Clock Co., New Haven, Connecticut, U. S. A.; Gustav Schrenk Schwenningen murttbug, Germany and Gebr. Muttchler, Schwenningh, Germany.

2319 I. A. P. I., Cochin.—Wants to be put in touch with importers of cocount oil and other Malabar produce.

2320 N. N. C., Gauhati.—For hydrogen gas you may use hydrogen gas generating machine which may be supplied by A. R. Khan & Sons, Chanda, C. P. It will not be advisable for you to prepare rubber balloons in India.

2321 M. S., Abbirajupalem.—We do not deal in any article, we only supply information to our constituents. For selling lace you may correspond with H. Ahmad Hasan Allawala, 69 Khangraputty, Barabazar, Calcutta.

2324 A. P. C., Rangoon.—You may go through Poultry Keeping in India by Isa Tweed

to be had of Thacker Spink & Co., 3 Esplanade East, Calcutta.

2325 S. M. S., Madura.—We think there is something wrong with your machine hence refer your query to the party from whom you have bought the machine.

2327 I. D. M., Peshawar.—Castor oil may be bought of M. M. Ispahani & Sons, 51 Ezra Street and Shewlall Shankerlall, 26/3 Armenian Street; both of Calcutta. Tallow may be supplied by Calcutta Tallow Mart, 19 Tiretta Bazar, Calcutta.

2329 D. D. H., Simla.—Refer to No. 1884 in November issue.

2330 S. M. Z. U., Rawalpindi.—Mustard oil or **Sarson** oil as it is called in vernacular is not suitable for hair oil. The required instrument may be bought of Remington Type-writer Co., 3/1, Council House Street, Calcutta.

2331 L. N. B., Cuttack.—For Japanese splints and veneers for matches enquire of H. Rashid & Co., 15 Zakariah Street and B. M. Start & Co., 133 Canning Street; both of Calcutta.

2333 P. V., Jagannaikpur.—Aerated water making machines may be bought of Amin Chand Mehra & Sons, 34/1, Armenian Street, Calcutta.

2335 U. B. D., Colombo.—Weaving accessories may be had of Bros. Partner & Co., 35 Ezra Street, Calcutta. Cotton yarn may be supplied by Sukdeo Ram Misra, 2/12, Cross Street, Calcutta.

2336 U. T., Lucknow.—Consult a physician.

2337 P. N. S., Chicacole.—Toy balloons may be supplied by A. R. Khan & Sons, Chanda, C. P. Motor tyres and tubes may be had of Dunlop Rubber Co. Ltd., Lindsay Street; East India Motor Ltd, 90 Clive Street and Calcutta Motor Accessories, 4/A, Chowringhee Road; all of Calcutta.

2338 C. S. B., Mayavaram.—Crown corks may be supplied by N. W. Mitchell & Sons. Ltd., 2 Dod Street, Lime House, London E.14, Olive oil and other chemicals may be had of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

2341 K. S. S. B. S., Madura.—Green copper-as is crude sulphate of iron. Chinese blue is

a kind of Prussian blue, the use of which in dyeing cotton, etc. may be found in August and September, 1925 issues of *Industry*.

2342 B. N. P. C., Gujrat.—Picture post cards may be supplied by Brocherioux Em, Rue du Loos, 18 & 20 Paris, France; P. Rachine & Co., etc. Boul Sebastopol 96, Paris, France, Photochemic G. m. b. H., N. Stolphischesstrasse 37, Berlin, Germany and Rommler & Jones G. m. b. H., Blasewitzerstrasse, 27, Dresden, Germany.

2344 G. N. R. B., Gudiyattam.—For rubber belts enquire of K. G. Maniar, 55/1 Canning Street, Calcutta. Electroplated wares may be bought of Whiteaway Laidlaw & Co, Chowringhee, Calcutta.

2346 T. G. S. P., Negapatam.—You may use broken pieces of glazed tiles in flooring for decorating purposes. You may also decorate garden walks.

2347 N. V. N., Madura.—Type casting machines may be supplied by Kerr George Frier, Canterbury Works, Canterbury Terrace, London N1. and R. P. Bannerman Son, Ringslade Road, Wood Green, London N22.

2348 S. P. K. M. B., Rangoon.—Face powder prepared by you will be injurious to skin. For good recipes consult September 1925 issue of *Industry*. For recipes of fever specific consult a physician.

2349 G. H. M. J., Bassein.—For fine printing write to Calcutta Fine Art Cottage, 76 Dharamtola Street, Calcutta. Empty bottles may be bought of C. K. Das & Sons, 17 College Street Calcutta; Satya Charan Pal 194 Old China Bazar Street, Calcutta and S. K. Dey, 124, Shova Bazar Street, Calcutta. Refer to No 2348 above.

2350 M. K. R. S., Itarsi.—For learning electrical engineering by correspondence write to International Correspondence School, Box 3995, Scranton, Pennsylvania, U. S. A.

2351 P. C. N., Allahabad.—Iron nails and screws may be had of Bhola Nath Mukherjee & Co., 11/2, Baranoshi Ghose Street and Dutt & Co., 30/1, College Street; both of Calcutta.

2353 H. A., Colombo.—Wants to be put in touch with manufacturer of foretelling mirror.

2354 N. S., Raichur.—Simple immersion in aniline dye solution will colour the gut.

2355 L. A., Harda.—For glass bottles refer to No 2349 above.

2356 J. K. S., Malda.—An article on biri making appeared in May 1925 issue.

2359 M. T. M., Tongoo.—This is a list of jewellery merchants of Amritsar: Bishen Singh & Sons, Hall Bazar; Harnarain Ruplal Khanna, Clock Tower; Kawal Nain & Sons and Ruplal Kaliaharn Khanna.

2362 A. H., Burdwan.—Recipe of liquid depilatory will appear in an early issue.

2363 N. G., Bombay.—Dies may be supplied by Rae & Co, 6/A, Madge Road, Calcutta. An article on die making appeared in September 1922 issue.

2364 K. L. S., Delhi.—For preparing Bengal confectionery i.e. Sandesh, Rasagolla, etc. you may go through Bengal Sweets by Mrs. J. Haldar to be had of Chackraverty Chatterjee & Co Ltd, 15, College Sqr, Calcutta.

2365 M. R. B., Bhera.—Chemicals may be bought of B. K. Paul & Co, 1-3 Bonfields Lane Calcutta and Bengal Chemical & Pharmaceutical Works Ltd, 15 College Sqr, Calcutta. Indian medicinal herbs may be had of Madhab Chandra Daw, 4 Armenian Street and Bansidhar Dutt & Sons, 126, Khengraputty; both of Calcutta. Wants to buy kharals, kiriana and pure steel used for medicinal purposes. Unless you acquire some medical knowledge it would be very difficult for you to learn the art of eye-testing, examining lenses, etc. by book knowledge only. For books on the subject you may enquire of Butterworth & Co, 8 Hastings Street, Calcutta. Addresses of advertising writer may be found in the Sale Exchange pages of *Industry*.

We are pleased to announce that the levy and collection of the Cotton Excise Duty has been suspended for a period of three months commencing from the 1st December, 1925 by the promulgation of a special ordinance by the Government of India.

NOTICES AND REVIEWS.

A Helpful Chart.

The "Chart of common complaints and their remedies" compiled by Dr. R. R. Mehrota, M.B., (Homeo) shows at a glance suitable homeopathic medicines for the more common ailments. It is obtainable from Rama Chemical Works, Ambala City.

A Panacea.

We have received from Printers Chemical Works, 71, Montgomery Road, Killa Gujar Singh, Lahore a sample phial of Amrit Tara which is claimed to cure 200 diseases!

Cleansing Agents.

"Klenzol" is a handy cleansing agent put in the market by Andheri Industrials, Marol Road, Andheri, Bombay. It will be found economic to use it for a number of household purposes where an easy and efficient cleanser is required. It has two sizes, No. 1 claims to wash 1500 clothes (printed 15000 through mistake in their Advt. Nov. issue) and No. 2. 1000 clothes. A complete set of outfit is also available along with it.

Acknowledgments.

We have received a copy of Safir-ut-Tujjar published by the International Trader's Exchange, Sadar Bazar, Delhi. It is a monthly trade Journal in Urdu.

We have received from the Students' Co-operative Store, Agra a Hindi Drama entitled 'Debakumar Surasundari.

Picture Cards.

Mr. N. V. Kale, Travelling Canvasser, P. O. Naregal, Dt. Dharwar has sent us a few cards containing photos of leaders, mythological pictures, etc. Our readers may write to him for his free sample scheme.

Advice to the Young.

Confidential Talks to Youngmen. By Prof. Satyavrata Siddhantalankar, Gurukula University, Kangri, Hardwar. Pp. 220. Price Rs. 3 only. Published by The Sharma Trading Co., Carnac Road, Bombay 2.

The author regrets that the cult of Brahmacharyya is losing its hold on the young generation of India and proceeds, with the best of motives, to warn his young readers, in their interest, against the dangers associated with the attainment of puberty.

Money Making Books.

Every Way of Earning a Living and Royal Road to Wealth. By T. K. Dorai. To be had of The Prince Mail Order Institute, 10, Tennore, Trichinopoly.

Some new ideas and suggestions for business and workable formulas for manufacturing are compiled in these booklets.

Mass Education.

A scheme of Mass Education, By Mr. A. B. Mande, M.A. (Columbia, U. S. A.) being Bulletin No. 1 of the Education Committee of Youngmen's Indian Association. To be had of Manager, Saraswati Press, Nagpur, C. P. Pp. 84. Price Re. 1.

The appalling illiteracy of the Indian people is a crying shame and any effort for the spread of education is doubly welcome. The scheme of education as formulated by Mr. Mande in his very interesting little book, aims at the removal of illiteracy and launching of cultural education to equip the people for adequate citizenship. We heartily commend the booklet to the notice of those who have the country's welfare at heart.

A Book on Sexology.

Self-help and Self-treatment in the Sexual Disabilities of Man. By J. D. Narula, and C. L. Varma, B.A., L.L.B. Barnard Palissy Company, Rawalpindi, Punjab, India.

This book, as its name implies, deals primarily with sexual diseases; their causes and remedies. A large part is devoted to functional impotence and other troubles connected with it. Sexual physiology has also been treated

Bengal Cottage Industries.

Report on the Survey of Cottage Industries in Bengal, published by Department of Industries, Bengal. To be had of Bengal Secretariat Book Depot, Calcutta. Price Rs 4/12/-

Now that there is a serious movement in the country for village re-organisation in which cottage industries will naturally play a very important role, this Government publication will render timely service. The survey appears to have been an exhaustive one and those interested in the revival of the arts and crafts of Bengal will find material assistance from the Report. It will show at a glance the existing condition of the home industries of Bengal their past glory and future prospects. The most noteworthy feature is, however, that lines of improvement in connection with these industries have been suggested and their scope pointed out. Incidentally it will afford a solution to the unemployment problem among middle classes

TRADE ENQUIRIES.

[To communicate with the parties write them direct with name and address as given below, mentioning INDUSTRY.]

2340. K. M. Yaji, 228 Amritwadi, Girgaon, Bombay.—Wants to be introduced to dealers in imitation rubies of Madras and Trichinopoly.

2343. The Dharamsi Morarji Chemical Co. Ltd., Sudama House, 31, Sprott Road, Ballard Estate, Fort, Bombay.—Require animal bones in very large quantities.

2358. Kumud Gogoi, Bonomali School, Suffry, Assam.—Wants to be put in touch with dealers in coptis tuta, crane feather, Assam musk and latta guti.

2375. Anirudha Sinha, Gandhi Vidyalaya, Hajipur, Muzafferpore.—Can supply honey and myrobalans in large quantities.

2402. Daulat Ram Vidya Perakash Sud, Moga, Punjab—Desires to be put in touch with purchasers of untanned crocodile skin.

2415. Nathu Ram, Nabab, Dist. Ambala.—Wants to be put in touch with dealers in dry ginger.

2430. S. Bhattacharjee & Sons, 58, Procession Road, Santipore, Nadia.—Can supply betel leaves.

2441. Gaya Prasad Devi Prasad, Makrand Nagpur, Kanauj City.—Requires essence agar.

2471. Abdulah Sons & Co., Karman Deorhi Market, Amritsar.—Desire to buy guts of all descriptions.

2475. Opliwell, Mohadeve, Cherrapunji, Khasi Hills—Can supply coffee, coffee seeds and orange seeds in very large quantities.

JANUARY ISSUE OF INDUSTRY.

(In The Press.)

The January issue of **Industry** will contain illustrated articles on Mineral Water Industry, Hair Oil, etc. besides the usual features comprising formulas, small trades, brief queries and replies. Any friend of our subscriber will get a copy free on application to the Manager.

INDUSTRY.

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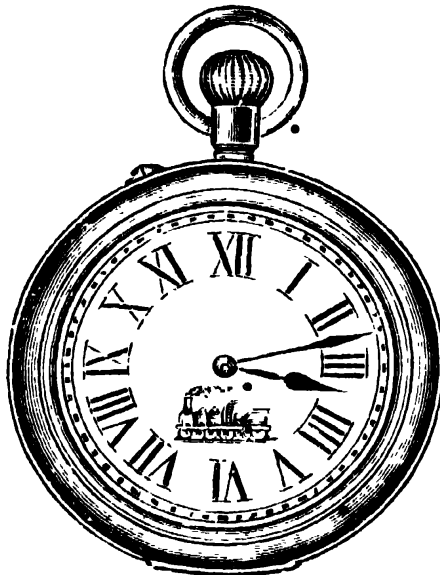
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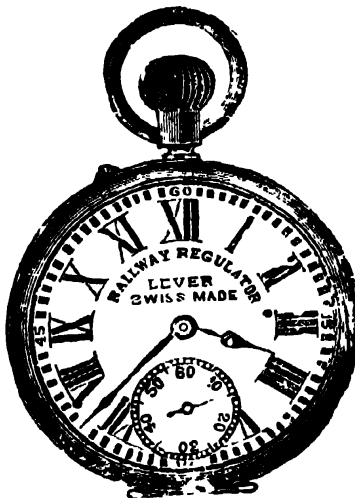
The watch being of Railway shape is of attractive appearance. It is handsome good looking watch and appears a high priced watch. Indeed an excellent watch for this low price. It is open face keyless nickelled case and always keeps correct time and is guaranteed for 8 years.

Price of the watch with box and a nice chain Rs. 4/8- (rupees four, annas eight only)

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It is with strong brass movement keyless hinged back, lever and with second hand. Railway servants and gentleman do like it always. It is a good timekeeper and works admirably. It is reliable and durable and an excellent watch. Its price with box and a nice chain is Rs. 5-10 (rupees five annas ten only).

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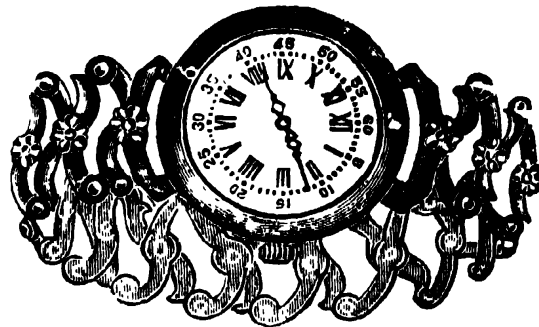
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burning of the soles of the hands and the feet premature grey, hair, falling off of the hair, baldness, scurf, dandruff &c. Its regular use makes the memory sharp and keen and the mind cool and cheerful.

A phial of Essential oil is also given along with each tin of Kashmir Kusum.

Each Golden decorated Tin Re. 1.

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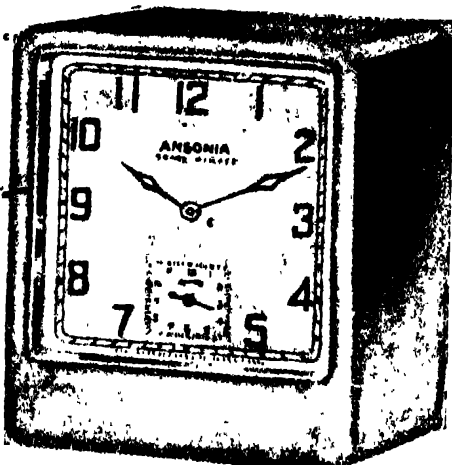
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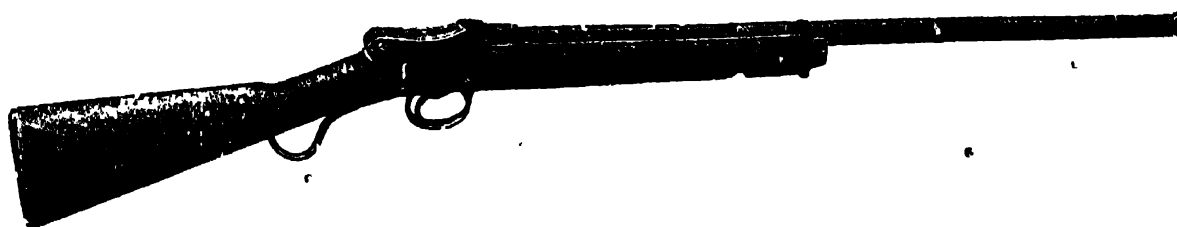
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Industry

A JOURNAL OF TECHNOLOGY, HANDICRAFTS & COMMERCE.

VOL. XVI.

CALCUTTA, JANUARY, 1926.

No. 190.

CO-OPERATION IN ADVANCEMENT.

THE excellent year of Nineteen Hundred and Twenty-six has already dawned on us with all the effulgence of a fruitful future and an incitement to look to the bright side of the present.

We send out our heartiest goodwill and promise of highest co-operation to all our readers and invite them to organise themselves to realise the better prospect in the ensuing year.

The advancement of the country demands better co-operation—we must avoid the delusion that individuals may rise by crushing others. The advancement of the country is the sum total of the advancement of the individuals. If there be any crushing of individuals, country's progress would be retarded. And this retarding would spell adversely on individual improvement; they are inter-dependent.

The best co-operation that would move the country on the road to progress is the co-operation between Work, Brain, and Money. The combination and deve-

lopment of labour is the organisation of the working capacity of individuals. You can run an engine but must require the help of a machinist to join your engine with a miller. And the milling man requires the help of the tiller of the soil to provide his mill with wheat. The resulting flour requires the help of traders to market. This combination of labour produces money to individual—as well as to the country's—gain. We are effecting this gain for centuries; but others are doing this for better result—better profit. Why should we not?

Here comes the work of intelligence—a combination of intelligence is a university which is producing in our country brain that cannot co-operate with labour. Everywhere producer of our food, producer of our wealth, producer of everything for our daily use are bereft of active and practical co-operation of the Brain of the country. Our economist is theorising in his arm chair, our chemist is confining his researches into

the glass phials of his laboratories, our lawyer having no other opening for earning, is inducing people into courts, our engineer is helping concentrated capitalism—they are the brain of the country, but they find no opening to join the mass labour to produce wealth.

The small producers, without the help of Brain, cannot combine their money for better productions. The combination of money is a Bank which our countrymen understand so little, that the institute is practically *non est* in the country.

The industrial consolidation in the country demands the combination of Work, Brain, and Money. In India we

have a civilisation ages old; we have a working system honoured by time; we have an intelligence which stands by its own eminence far above the working system which shapes our material progress. The country demands an advancement and consequently co-operation between work and intelligence. The Intelligence must have to come down to the level of the labour or must raise it up to its own level. Here is the field where co-operation is in urgent demand. It is development of one-self and helping others to rise in their own sphere. Are the countrymen ready? Chances are prolific but you must rise up to avail yourself of the chance.

RESOLVE FOR 1926

AWAYS to be on the bright side of the road on life's journey and to do my best to brighten up the shady side.

To keep myself in good health and in good humour and do away with the darkness of jealousy and depression.

To make my surroundings happier and more confident in the goodness and justice of life.

To be enthusiastic about the success of my friends and fellow-workers.

To believe in the possibilities of every right and beneficial thing.

To believe in the utility of to-day and think less of yesterday.

To hope for the future and to appreciate all my good fortune and to be worthy for more.

To share my luck and my abilities and my success with others who are worthy but less fortunate.

MINERAL WATER MANUFACTURE.

THERE are only two varieties of drinks made from the Soda plant, viz. Soda Water and Sweet Beverages. Much was dealt on this subject in the two previous articles published in the last October (XIV Vol.) and April (XV) issues of INDUSTRY; but further queries received by me show that there is sufficient matter to be cleared up which is fully explained in this article.

Soda water, as is well-known is a favourite beverage, formed by supersaturating a solution of bicarbonate of soda with carbonic acid produced under considerable pressure. This is accomplished with the help of soda machines of which there are many types now-a-days.

The machine shown in Fig. 1 is of a very good type in which arrangements for gas making are self-contained, where a produce of nearly 100 dozen of Soda Water or a larger quantity of Syruped drinks are required for a day.

- A. Gas Generator.
- B. Sulphuric Acid feed box.
- C. Gasometer.
- D. Condenser.
- E. Pressure Gauge.
- F. Water Gauge (cannot be seen in the illustration).
- G. Discharge Valve or Bottling Cock.
- H. Gas pipe to machine.
- I. Soda pipe to filler.
- J. Acid pipe to generator.
- K. Gas pipe to gasometer.
- L. Fly-wheel.
- M. Water tub.

Fig 2 is one of the popular models of small plant for use with liquefied carbonic acid gas. The gas cylinder N is attached to the machine. O is the Turnover filler consisting of the following parts:

- 1. Handle.
- 2. Body for bottle spring.
- 3. Turnover Arm.
- 4. Swift Valve Spindle.
- 5. Bottle guard.
- 6. Soda inlet valve.

Fig 3. shows the detailed sketch of the top of the cylinder.

Fill the solution pan with solution of soda, about one ounce of bicarbonate of soda to 2 gallons of water. Usually this solution is made in a large cistern of slate, or wood lined with lead, from which it is conveyed to the solution pan by means of a pipe and tap. The gasometer-tub is filled with water up to a constant level, above which the opening of the pipe coming from the solution-pan is kept, while the other pipe connected with generator, is kept well under the water. The bell of the gasometer being down, mix about 14 lbs of powdered whiting with water, to the consistency of cream, and pour into the generator till it is about two-thirds full and carefully close. Next screw the leaden acid feed box on the generator. Put in about a quart of diluted sulphuric acid—half acid and half water—through the funnel. This should be mixed in an open vessel. Muriatic or nitric acid may be used, if sulphuric acid cannot be obtained.

Turn round the agitator, the handle of which is on the top of the generator. As soon as the acid is mixed with the whitening and water, gas is generated and passes up the pipe into the raising bell or gasometer which it elevates by its pressure. The end of the other pipe is turned down below the surface of the

When the addition of acid and the turning of the agitator fails to produce more gas, then it is to be learnt that the whitening is exhausted and must be removed. It is important that this should be done after each time of using, before the whitening sets hard, or there will be a difficulty in getting it out and a liabi-

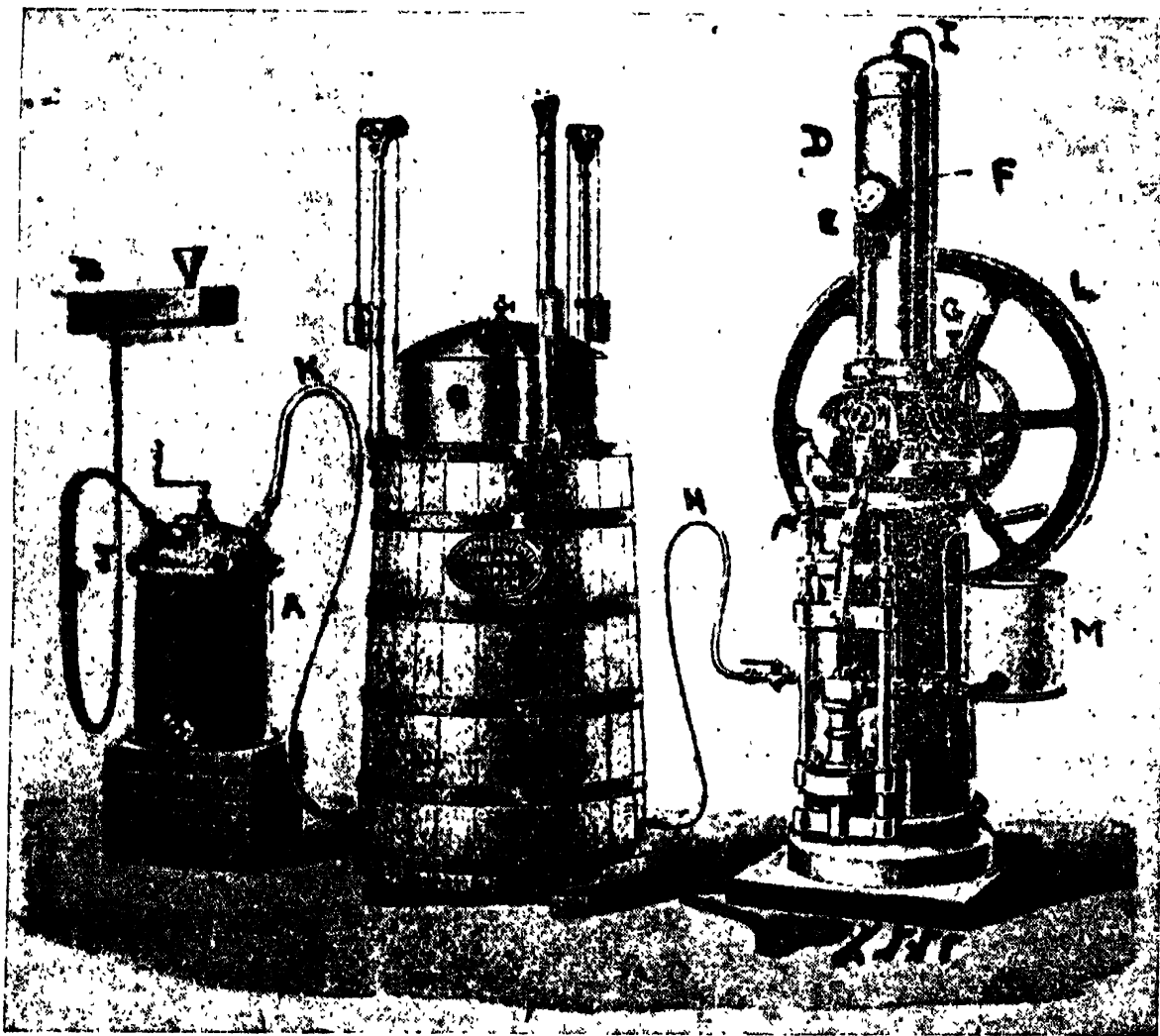


Fig. 1.

water, so that the gas should be conducted slowly. Care should be taken to see that only a small quantity of acid falls into the generator at a time: otherwise the gas would be generated too quickly and throw the whitening and water into the pipe and probably injure the generator.

lity of straining or breaking the fan of the agitator. On the first time of using there will be a quantity of air in the gasometer which is discharged by opening the cock. When the gas has a pungent smell it is fit for use.

The gas-tap and water-tap are provided with index plates. The bottler

must partly open or close them to suit his requirements. The machine must not be worked with the water-tap open alone. The machine being set to work the gas is drawn down the pipe which stands above the level of the water, through the other pipe and is forced into the condenser, where an agitator worked by the spur wheel, revolving rapidly, mixes it with the water which is drawn from the solution pan in like manner. When the pressure is up, the safety valve will lift, and soda water may be bottled from the rose.

Having explained the preparation of gas let me explain how to use cylinder gas which has already been reported to be economic and useful for the small capitalist. Fix the gas cylinder into the cast-iron cylinder stand, and tighten up firmly with screw bolt. Care should be taken to have the cylinder perpendicular. Remove the cylinder cap, unscrew the brass nut from the gas-outlet of the cylinder valve. This nut must be replaced and the cap screwed when you return the cylinder to the gas manufacturers for refilling. Now allow the gas to pass into the reducing valve, the gauge of which will indicate 100. Open the tap below the reducing valve and the gas will pass into the condenser.

Then the question comes how to bottle. Take the bottle in the right hand and place its neck first into the India rubber recess below the Syphon-cock, then pass the handle downwards and place the bottom of the bottle on wooden seat. Care must be taken that the bottle is firmly pressed against the India-rubber by the spring below the handle, other-

wise there will be waste of water and gas. This can be easily regulated by the set screw. When the bottle is in position, pull the lever or handle on the

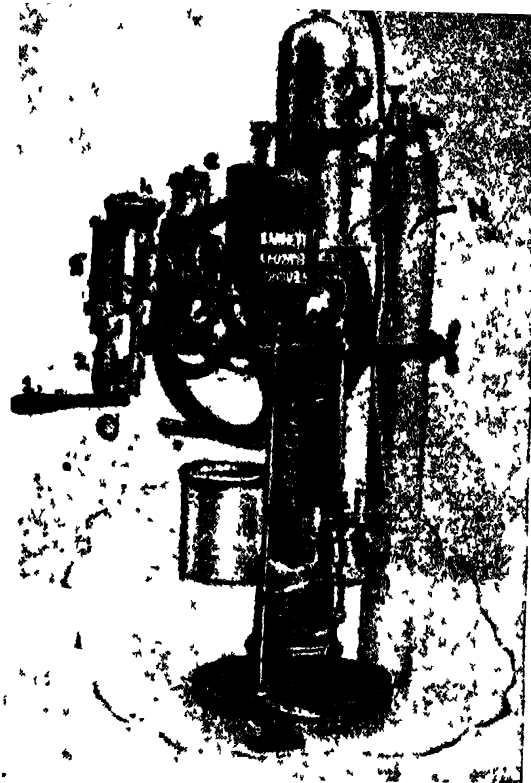


Fig. 11.

syphon cock towards you, about a quarter of a turn, the water will then pass into the bottle. Before the neck of the bottle is quite full shut the syphon neck and invert the bottle so that the glass ball may fall into position. Release the bottle by lifting the handle up a little and pulling the bottle out. It is very important that on no account should any one interfere with the regulating screw in front of the reducing valve. It may be mentioned that the syphon cock when shut has the lever or handle pointing directly towards the condenser or mixing vessel and is open when it points topwards. When the work is stopped for

the day, shut the hand-wheel valve of the cylinder tightly. A few hours' practice will give you splendid results if you carefully note these instructions.

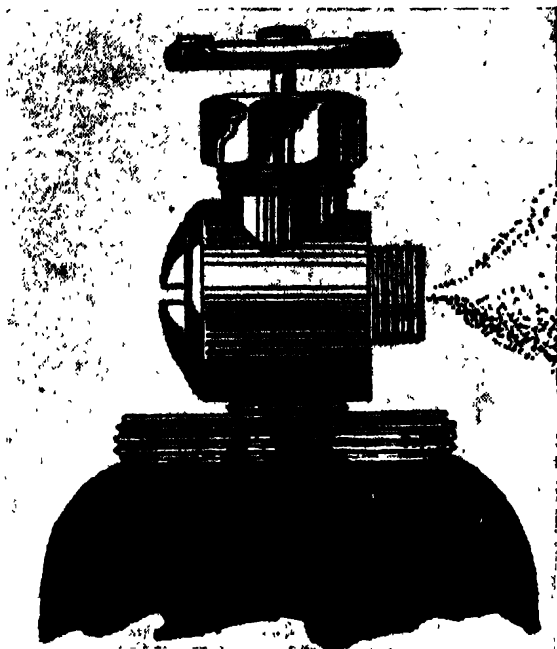


Fig. III.

There appears to be no treatise on this subject written for the use of Indian manufacturers and the one or two books on the market do not contain or explain any of the notes given in my articles on the subject, for you must know that there is a trade secret for every business. The success of every business depends upon close study and sincere work. Books only help the manufacturers to go on with their work and success of manufacturing depends upon the workers themselves. The art of making any substance is the secret of the factory. No factory discloses the cheap methods of preparing its goods. When you will be successful in making any proprietary article you shall have found out some difficulties, which you will not be willing to disclose to others. This is what is called a Trade Secret. But to the best of my knowledge I have given out every clue and it is now open for you to give

a real start and reap in the profits. An estimate was already given in the first installment (Oct. 1924 INDUSTRY).

Lemonade and other sweet drinks can be made by first putting the necessary quantity (1oz.) of syrup for 12 oz. bottles into the bottle and bottle it in the same way as for soda. Care should be taken not to drop the syrup when putting the bottle into the filler. The following recipe is used by us.

Pure Water	1 gallon (9 bottles).
Sugar	8 lbs.
Saccharine	1 nickel-anna weight
Citric Acid	1½ oz.
Sea Foamine	¼ oz.
Essence	1½ oz.
Colour	1¼ oz.

Dissolve the sugar in the water, bringing it to and keeping it at the boiling point for about five minutes, add citric acid, then strain through a clean muslin or filter cloth which has been well sealed immediately before use. Finally add the other ingredients one by one when the syrup is lukewarm. This recipe combines in a wonderfully successful manner the virile and pungent flavour of the fruit, essence of which has been used with its outstanding characteristic, making the beverage what is just perfection.

Before concluding let me state that Soda Water is not only drunk for luxury but mostly because it possesses the property of digestion, mitigates fever and clears the bowels. It is also used as the curative measure for stomach-ache, it gives a healthy tone to the lungs, helps in the aeration of blood and infuses strength and energy.

—By Mr. E. Lakkaraju Naidu.

INDIA AND THE MATCH INDUSTRY.

INDIA imported in the year 1922, 11,775,120 gross of fine match boxes valued at Rs. 3,52,37,102. The countries from which India imported matches were Japan, Sweden, Norway, etc. The imports represent almost the total quantity of matches consumed in India, the amount manufactured in the country being trifling. The enormous amount represented by the above figures, testifies sufficiently to the importance of the Match Industry to India and to the almost complete dependence of the country on the foreign imports for her supply of matches.

India possesses a large number of advantages for the manufacture of matches. Labour in this country is comparatively cheap. The market for the manufactured product being within the country she has not to pay the transport and the insurance charges, and freight. To add to all this, the Government of India have, with a view to protect and encourage the indigenous match industry, levied an import duty of Rs. 1/8 per gross. It has been the custom of some manufacturers to import the necessary wood from foreign countries, in the shape of veneers (i.e., wood peeled in the form of a thin continuous sheet), and splints; and manufacture matches from them. The Government have also levied a duty on these imports. These duties confer an enormous advantage, upon the Indian manufacturers. Best quality imported matches are selling in the market at Rs. 2/8 per gross so that the foreign manufacturer is able to deliver in India, matches

at Re. 1 per gross, and still makes a profit. Thus if the Indian manufacturer can produce matches of good quality at Re. 1 per gross, he can easily make a profit of 150 per cent.

In spite of these enormous advantages, it is quite true that India possesses no large Match Industry. This is a fact known to every layman, for it is rarely if ever that anybody comes across a match box which bears upon it the stamp 'Made in India.' Nor have attempts been wanting in the past to start a Match Industry in India. But these have all been more or less failures. It should surprise many as to why Match Industry with all these advantages should not have prospered in India.

The chief raw material of the Match Industry is wood. The wood for this purpose should be soft, white, even and straight grained. Further the site of the Factory should be so chosen, that wood of the right quality can be cheaply obtained; while at the time there should be available a cheap and abundant supply of labour. Further the Factory should be able to secure, expert technical advice and efficient machinery. The Factory should also be able to secure a local market, as the price of the product to a distant market is increased by transport charges. The chief stumbling block in the way of success has been and is the problem of wood supply. The other difficulties can be and have been easily surmounted. There are said to be several woods in India, suitable for the manufacture of matches. Mr. R. S. Troup of the Government of India, in a book published in 1910, entitled 'The Prospects of the

Match Industry in India,' considered that there was scope in India, for starting 70 Match Factories, each with a capacity of 700 gross per diem, with the woods available in India. But the fact remains that not one such Factory has been started till now, despite the alluring prospects of such a venture. The reason for this is that no absolutely suitable wood has hitherto been obtained in India. The European and Japanese manufacturers use the woods of the poplar, a willow and alder, and we are told that several species of these exist in India. But I am doubtful whether the species which exist in India are exactly the same as those used by foreign manufacturers. If that should be so there is no reason why such a paying industry as the Match Industry should not by this time be one of the established industries of the country. Have the Government of India or the Department of Industries of the various Provincial Governments tried to grow the foreign species in those Indian forests which have a suitable climate? If such species can be grown there is no reason why plantations of the same should not be started in India. Rubber plantations are a striking example of the success which might attend such plantations. Fifty years ago, the world's supply of rubber was entirely from the wild forests of Brazil. But rubber trees were planted in other countries with a suitable climate, so that today more than 80 per cent. of the world's rubber supplies is obtained from the plantations of India, Ceylon, Malaya Peninsula and Indies.

I would therefore request the Government of India, the various Provincial

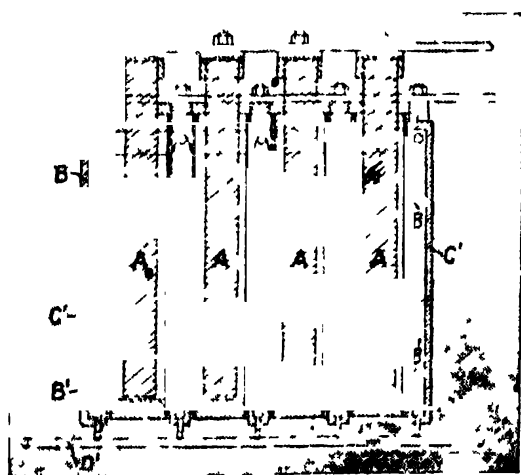
Governments and the Rulers of the India States to take the necessary steps for planting exactly the same species of wood as are used by European and Japanese match manufacturers, in the forests of India. If such plantations should prove successful the problem of Match Manufacture in India will be solved. The advantages which would accrue from the establishment of a great Match Industry would be enormous. Unemployment will be lessened and the country will become rich, and independent of foreign countries for one of the vital necessities of life. Therefore the taking of steps for the introduction of the foreign wood in the Indian forests, is a duty which the Governments and the Rulers of the Indian States owe to the people. I would therefore once again request that all the Governments should take immediate steps necessary for the introduction in the Indian forests of plantations of match wood used by European and Japanese manufacturers.

—By Mr. C. Ramanathan.

A clean life, an open mind, a pure heart, an eager intellect, an unveiled spiritual perception, a brotherliness for all, a readiness to give and receive advice and instruction, a courageous endurance of personal injustice, a brave declaration of principles, a valiant defence of those who are unjustly attacked, and a constant eye to the ideal of human progress and perfection which the Sacred Science depicts—these are the golden stairs up the steps of which the learner may climb to the Temple of Divine Wisdom.

SODA ASH FROM SODIUM CHLORIDE.

SODIUM carbonate, commonly known as soda ash, may be obtained by the electrolysis of sodium chloride or common salt. There are several methods but the Hargreaves-Bird Cell is generally preferred for direct production. It is of special construction and is illustrated in the accompanying diagram. A A are carbon anodes dipping into a saturated solution of sodium chloride contained in the anodic cells BB', B'B. The wells of these cells are made up of cement or



some similar material, to which is affixed on the outside a network of iron gauze, which forms the cathode. The salt solution flows into the anodic space through a tube near the top, and pours through the diaphragm surrounding the anode, out through the wire gauze into the exterior empty space DD, finally escaping through the tube D'; as the salt solution pours through the cell, subjected to the powerful electrolytic action by the current passing from A to B', and consequently the salt solution emerges through

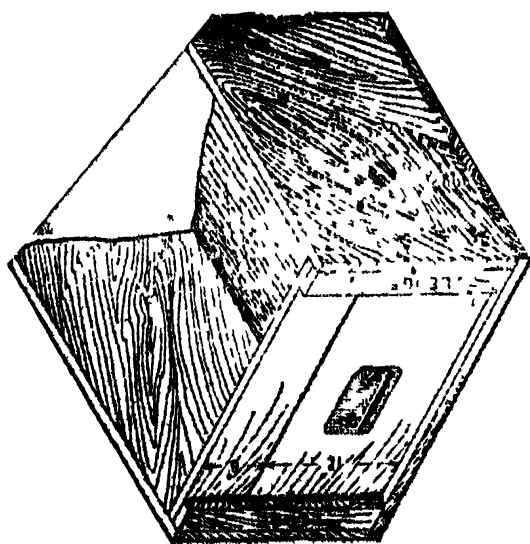
the diaphragm into the exterior empty space DD, it is largely decomposed into sodium hydroxide. In DD, however, it meets with a stream of steam and carbon dioxide which immediately combines with the hydroxide to form sodium carbonate, which pours off through D'. The exterior space DD thus remains empty. The sodium carbonate liquor is gradually evaporated and the crystallising sodium carbonate separated by centrifugals.

THE MAGICAL BOX.

THE "locked and corded box" trick is a favourite one with the conjurers. To work this to the complete bewilderment of the audience a wooden box of special construction will be required. The wood may be of any rough kind $\frac{5}{8}$ in. or $\frac{3}{4}$ in. thick, nailed together with $1\frac{1}{4}$ in. or $1\frac{1}{2}$ in. wire nails. For a full-grown performer the size might conveniently be 6 ft. high, 2 ft. 6 in. wide, and 1 ft. 6 in. deep. For a child the height need not be so great, of course. Make the back, front, bottom, and lid separately, nailing the ledges across the planks to hold them together, as shown in the figure. Make one end in the same way, but leave the parts that form the other end unnailed for the present.

Nail together the back, front, bottom, and the finished end, and put on the hinges, lock, and one of a pair of handles for the ends. The remaining end will now be composed of two ledges and the planking. Arrange to have this planking in two pieces, one being 6 in. wide, the other 12 in. wide. Nail on the two ledges and the 6 in. wide piece, leaving space

for the 12 in. piece between this and the bottom. Nail the 12 in. piece temporarily in position, leaving the nail heads projecting so that they can be easily withdrawn, and bore four holes—two through the back of the box into the 12 in. piece, near each corner and central to the thickness of the wood. The four holes must be of a size that will allow of four nails—like those used for the other parts of the box being pushed in and drawn out by thumb and fingers without too



much difficulty yet not too easily. Remove the 12 in. piece, and drive nails through the ledges exactly where they would be driven if the 12 in. piece were there. File off and make level with the ledge on the inside the ends of the nails that come through. Drive in four nails, similarly placed, at the other end so that there shall be no apparent difference and fix on the other handle. The esoteric person gets into the box, is locked in, and corded up. The conjurer outside, as a final act, before investing the box with a screen, removes the four nails from the four holes, and so leaves the inmate free to draw in the 12 in. piece and come out. When out, he pulls back the panel and puts in four more nails to hold it in its place. The work of the conjurer is to keep the investigators engaged upon the knots and seals of the cord.

PREPARATION OF CATECHU.

(BY A PRACTICAL EXPERT.)

CUTCH is the extract of the plant *Acacia Catechu*. It is known in the vernacular as khair and is one of the essential concomitants of Betel, the chewing gum of the Indians. The crude product is obtained in lumps mainly from Rangoon in Burma and Janakpur in U. P.

The crude stuff is washed to free it from dust earth etc., adulterated with chalk, gum etc, formed into one inch cubes and sold as Papri and Phul Khair.

Kea Khair is an aromatic preparation of which khair forms the basis. The spices are worked into it in suitable proportions and the paste is scented chiefly with kea or ketaki the fragrant flower of the *Pandanus*. Hence the name kea khair. Bits of it are put in the making up of *pan supari* and on being chewed perfumes the breath.

Lac is the well-known product of the insect *Tachardia lacca* grown on various trees. That obtained from kusum tree is the best variety. Next come Mowha and Aswatha lac. The crude lac is obtained as stick lac; it is crushed and freed from twigs etc. The process of making shellac from crude lac by incorporating resin, turpentine etc., is detailed in the accompanying recipes.

In working with the above recipes great precautions are to be taken so as to prevent accidents from fire.

PAPRI KHAIR.

Take 5 srs. of crude catechu lumps and pulverise them. Put the powder

in a clean piece of rag folded twice. Tie up the four corners of the rag and suspend it over an earthenware vessel. Pour water in the vessel so that the catechu inside the rag may soak in it. Set the arrangement aside for 48 hours. The impurities of the catechu would have dissolved away by this time. Now collect the corners of the rag together, tie up, take away from the vessel and hang up to drain. When the dripping has ceased, spread the clayey mass over a plain plank of wood to the thickness of one inch and dry in the sun. When the mass has solidified a little cut it up into squares 1 in. by 1 in. Finally dry the cakes until hard.

(2)

Take 5 srs. of Janakpur catechu and treat as in (1). The adulteration is made up as follows. Pulverise finely 5 srs. chalk of good quality. Put the powder in an earthenware vessel, add a quantity of water to soak them and boil on fire until the mass is soft and clayey. Remove from fire and when dry add $\frac{1}{2}$ poa of this to every seer of catechu above: Mix thoroughly, spread on a plank to 1 inch thickness and cut into squares 1 in. by 1 in. Put in the sun until dry.

(3)

Take $2\frac{1}{2}$ srs. of Rangoon catechu and treat it as in (1). Mix with it $1\frac{1}{2}$ srs. chalk in fine powder and 1 poa gum arabic. Spread the mass and cut into 1 inch cubes as before. Finally dry them in the sun.

PHUL KHAIR.

(4)

Take 5 srs. of finely pulverised chalk,

put in a vessel and pour the water in which catechu has been soaked (in the above processes). Make into a paste and mix into it 5 ch. of gum arabic in powder. Dry in the sun; but next day again reduce it to a paste with catechu-water. Repeat the operation for seven days. Finally spread it on a plank to 1 inch thickness and cut into 1 in. squares. Dry the cakes until hard.

(5)

Steep $\frac{1}{2}$ sr. gum arabic in 5 srs. of water for 24 hours. Then soak $2\frac{1}{2}$ srs. Janakpuri catechu in the above solution. When the mass has become a paste mix into it 1 poa pure arrowroot and spread over a plank to 1 in. thickness. Cut into 1 in. square when hard.

KEA KHAIR.

(1)

Soak $2\frac{1}{2}$ srs. of Janakpuri catechu in sufficient quantity of water in an iron pan. When it has become soft put the pan on fire and work the catechu into a hard mass. Then remove and incorporate the following spices.

Seeds of cardamom minor	2 tola.
Coriander seed	1 poa.
Aniseed	$\frac{1}{2}$ poa.
Carraway	1 ch.

Now select some good broad Keora leaves. Spread the above prepared paste on the leaves about 3 ins. long and 1 in. broad. Then wrap up the leaves so that the mass within is exposed nowhere. If the wrapping is not satisfactory or complete with one leaf employ another. Wind up fine twine closely round the packet thus obtained and put out in the sun. When they are dry and hard store in air-tight tin pots.

(2)

Take 3 srs. of Rangoon catechu; put it in a piece of rag folded thrice and soak it in water. When it has become soft bring out from water, squeeze and dry in the sun on a plate. Knead into a dough and incorporate the following spices.

Cloves (bruised)	1 ch.
Cinnamon (in shreds)	$\frac{1}{2}$ poa.
Cardamom seeds (fine powder)	1 ch.
Coriander seed (baked)	1 poa.

Mix thoroughly into the catechu paste and tie up with keora leaves as before.

(3)

Take $2\frac{1}{2}$ srs. of Black catechu put inside a piece of rag folded thrice and soak it in water for 24 hours. Then take out hang up to drain and dry a little in the sun; knead into a dough and incorporate the following spices.

Nutmeg	$\frac{1}{2}$ ch.
Aniseed	1 ch.
Carraway	1 ch.
Sandal dust	1 tola.
Cloves, bruised	1 tola.
Coriander seed (baked)	1 poa.
Cumin seed (black)	1 ch.

Mix together and work into the catechu. Finally wrap up with keora leaves as before and dry.

(4)

Take 5 poa Rangoon catechu and $2\frac{1}{2}$ srs. of Janakpuri catechu powder thoroughly and soak in water in a vessel. When it softens to a paste mix $\frac{1}{2}$ poa pollens of keora flower. Dry in the sun a little and knead into a dough. Now macerate 1 anna musk in 1 tola rose water

in a stone mortar and add to the paste. Also incorporate the following spices.

Kashmiri Saffron (dust)	1 tola.
Cardamom Major	1 ch.
Cardamom Minor	
(bruised seeds)	1 ch.

Work the paste thoroughly and tie up wrapped in keora leaves as before.

(5)

Take 3 srs. of Janakpuri catechu in a suitable vessel and dredge it with 3 chs. pollen of keora flour. Wet the two together with sufficient quantity of keora water. Knead into a dough and incorporate into it the following spices.

Cardamom minor seeds	1 ch.
Cardamom major seeds	1 ch.
Kashmiri Saffron	3 tolas.
Corinader seed	1 ch.
Carraway	$\frac{1}{2}$ ch.

Mix together and work it into the above paste. Spread on keora leaves wrap in and tie up as before. Finally dry hard in the sun.

(6)

Take 5 srs. Janakpuri catechu and pulverise the lumps thoroughly. Put in a vessel and add sufficient rose water. Now add the dust of $\frac{1}{2}$ seer dried roses (without the stalks) and store away for 12 hours. Then add $\frac{1}{2}$ poa pollen of Ketaki flower, mix well and store away for 24 hours. Dry the mass a little in the sun and knead into a dough. Then incorporate the following spices.

Liquorice powdered	$\frac{1}{2}$ poa.
Carraway	$\frac{1}{2}$ poa.
Cardamom major	2 tola.
Cardamom minor	2 tola.
Corinander seed (baked)	$\frac{1}{2}$ poa.
Chua	2 tola.

Mix thoroughly and adopt the finishing process as above.

(7) •

Take 2 srs. of Janakpuri catechu and soak it as before. Drain it, dry a little and knead into a dough. Incorporate into it the following perfuming agents.

Pollen of keora	$\frac{1}{2}$ poa.
Coriander seed (baked)	$\frac{1}{2}$ poa.
Aniseed (baked)	1 ch.
Liquorice (powdered)	1 ch.
Mace	1 tola.
Cardamom major	1 tola.
Cardamom minor (bruised seed)	1 tola.

Mix thoroughly, wrap in keora leaves and tie up as before.

(8)

Janakpuri catechu	1 sr.
Dried roses	1 poa.
Sandal dust	$\frac{1}{2}$ ch.
Keora gad	1 tola.
Ketaki pollen	$\frac{1}{2}$ ch.
Allspice	1 ch.
Mace	1 tola.
Saffron	1 tola.
Cardamom minor	1 ch.
Aniseed	1 poa.
Musk	1 poa.

Take the catechu, powder and soak in keora water. Mix with it rose powder, sandal dust and ketaki pollens and dry in the sun to a dry lump. Next macerate it the other perfuming agents. Then incorporate this paste into the catechu treated as above and finally wrap in keora leaves, tie up, dry in the sun and pack air-tight.

SHELLAC PREPARATION.

(1)

Take a quantity of crude lac from Mowha tree, free it from foreign matter and pound to powder. Melt it in an iron

pan. Now spread a plantain leaf on a broad plank and pour on it the molten lac. Cover up with another plantain leaf and press with a wooden plank. The lac cakes will be flattened thin. This is known as *patgala*. The smooth sides of the leaves must be in contact with the lac.

(2) •

Take $2\frac{1}{2}$ srs. of crude lac from Mowha tree and mix with it $2\frac{1}{2}$ to 4 ch. of resin. Melt the two together in an iron pan and pour on plantain leaves in several lots as before. Roll out with a rolling pin thin like paper. On drying the product will be brittle and break into flakes. These are known as *Chanch gala*.

(3)

Kusum lac	4 lbs.
Yellow resin	2 lbs.
Venice turpentine	2 oz.

First powder lac and resin into powder and put in a pan. Mix in the turpentine and melt on a slow fire. Pour on plantain leaves and press into thin flakes. The product will be of good quality and may be used in making sealing wax and the like.

(4)

Take a quantity of crude lac from kusum tree, pound into powder, mix with resin. ($\frac{1}{2}$ poa for every seer of lac) Melt in an iron pan. Now make a plain broad plank of wood smoothly oiled and pour on it the molten mass. Roll it out thin with an oiled rolling pin. The thinner the better. This is an easy process.

(5) •

Take a quantity of crude lac from Aswatha tree free it from extraneous matter like twigs etc., and pound to powder. Then boil it in a vessel with a sufficient quantity of water. When the water has become coloured blood red,

throw it away and pick out the lac mass. Dry it and pound to powder.

Now take 5 srs. of this powdered lac and mix with it $1\frac{1}{2}$ poa red resin, melt over a slow fire. Pour on a plantain leaf and press into thin flakes.

(5)

Take 1 sr. of crude lac of Aswatha tree and boiled as above; 2 srs of yellow resin, 1 sr. of Kusum lac and 1 sr. of Mowha lac. Pound these together into fine powder and melt on fire in an iron pan. Now pour the molten mass on plantain leaves as before but rather thick.

(7)

Take 2 srs of Kusum lac, 1 sr. of Mowha lac and pound together. Put in an iron pan, mix $1\frac{1}{2}$ srs yellow resin, and melt over fire. Ladle out the molten mass on plantain leaves and allow the cakes to cool.

GLOSSARY.

Aniseed—*Mauri*.

Allspice—*Shahjeera*.

Cardamom—*Elachi*.

Carraway—*Ajowan*.

Cinnamon—*Dalchini*.

Cloves—*Labang*.

Coriander seed—*Dhania*.

Cumin seed—*Jeera*.

Liquorice—*Jasthimadhu*.

Mace—*Jaiti*.

Musk—*Mriganavi*.

1 sr. equals 4 poa.

1 poa equals 4 ch.

1 ch. equals 5 tola.

16 annas equal 1 tola.

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HAIR PREPARATIONS.

IT goes without saying that several manufacturers of different varieties of preparations, such as, Hair Oils, Hair dyes, Hair washes, Shampoos, Bath Oils, Hair destroyers, etc., are making enormous profits in our country. Some of these no doubt are efficacious and agreeable while others are only meant to meet the demand in the market which is growing every day.

ORIGIN OF HAIR OILS.

The origin of Hair oils dates from time immemorial in our country, as it is considered that the natural luxurious growth of hair is essential for the natural beauty of especially our fair sex. Much care was and is being bestowed upon the protection and rearing of hair in the head. There are several conditions to be satisfied in order to consider the hair to be beautiful. Chief amongst these are their being curly, soft, black and lengthy. Unlike the western ladies, our ladies do not try to obtain curly hair by artificial means and the other conditions cannot in any way entirely be obtained except by natural means. Protection, preservation and careful attention by way of dressing, taking periodical and frequent baths go a great way to promote the healthy condition of the hair.

OUR ANCIENT METHODS.

The wisdom of our ancients is much praiseworthy in this respect. They never took to costly and unnecessarily luxurious substitutes for promoting the growth and preservation of hair. Whatever they used were all tried ones and scientifically efficacious in giving the desired result. Our weekly oil baths in which sweet oil

or a mixture of oils are boiled with drugs, are in themselves very effective in obtaining the best results. In these baths they never restored to any alkaline materials for removing the oil and cleansing the scalp. They always used (and we are even to-day using) a very mild cleansing powder made out of the leaves of a tree whose botanical name is *Albizzia Amara*, mixed with a small proportion of soapnut powder. This tree has a wild growth in the South and when the leaves are tender during Spring, they are collected, dried and powdered for use during the whole year. When it is rubbed on to the hair, in conjunction with water, it becomes frothy combining itself with the oil present in the hair and immediately cleanses the hair. It is not my purpose to dwell on the details of this, but I can say that oil bath is a function amongst the Hindus, which makes its start when the child is born.

Apart from this, the hair of the children, especially females, should not be neglected even for a day without dressing and braiding. This will help the preservation of hair without getting entangled and thereby causing waste. It is for this dressing purpose that numberless varieties of hair oils have been invented and finding sales in the market. Formerly no attempt was being made for unnecessary waste of money. Ordinarily sweet oil into which some marking nuts were broken and boiled was all that was being used for promoting the growth of hair. Its efficacy is two-fold; one by acting as a germicide in preventing the hair from their pests ordinarily known as lice;

secondly, by imparting a lustrous ravenous black colour to the hair.

In order to impart a silken gloss to the hair, a preparation of sweet oil which took a long time for manufacture was in vogue amongst our people. This is highly commendable when the hair has fallen off by reason of long illness. The troublesome part of the preparation is in getting the material to be boiled in oil ready by means of fermentation.

METHOD—Obtain a couple of well-ripened pears. Cut them crosswise, squeeze off a portion of the juice. Stuff them with powdered Fenugreek (*Bot. Trigonella Foerum Graceum*) and bury them in the ground in a hot place, preferably near a house-hold hearth. Fermentation will set in and in about ten or fifteen days, they become spongy. After taking them out, boil the stuff with sweet oil taking a quantity as much as one viss. Then strain the production and bottle it. This can be scented to our requirements and used. No other preparation is so effective as this. A trial of this will convince the user. This is a very cheap hair oil, since its efficacy is established.

FLORAL HAIR OIL.

Besides the above, there was another cheap floral hair oil that was being used by our ancestors. For this purpose Til or gingelli, the common oil-seed of our country was first cleansed white by saturating in water and rubbing on a rough surface of ground or preferably on a stone slab. Then the cleansed oil-seed was dried in combination with *Jesamine*, *Roses*, *Champakā*, *Kethaki* and other

flowers (always in shade) for about a week, renewing the flowers every alternate day. Then oil was extracted out of the seeds in the ordinary way of milling. This oil, owing to the seeds having been in contact with flowers does not require any superficial perfuming and would not require any colouring matter.

The introduction of ready-made hair oils available in the market put a stop to the above oils, thus making our ladies grow lazy; just as the introduction of pounding and hulling mills have done. Even the manufacturers of hair oils do not care to take the trouble of preparing the article with due regard for effectiveness. By preparing the oils as detailed above, not only the articles would be effective but also they would go to promote the economical development of our country.

MODERN HAIR OILS.

The modern methods of the preparation of hair oils consist in using almost all the materials which are of foreign origin and thereby draining off the resources of our country. The oil mostly employed for the preparation is white oil which is nothing but deodorised petroleum imported from foreign countries. Though it might be cheap when compared with our vegetable oils, whatever we are made to pay for it goes to enrich foreign countries at the cost of our resources. Beyond this I cannot contend against its being conducive to the interests of the users of otherwise. The natural oils detailed above do not require any artificial colouring owing to the fact that the natural colour of these is in itself attractive. But, if required, they can be coloured to the taste and fancy of the users in the same manner as the white oil by means of alkanet roots or any synthetic oil-soluble colours.

COCONUT OIL.

Coconut oil is one of the best mediums for being used for hair oils. The

ordinary oil available in the bazaar is rancid and not agreeable in smell. The disagreeable smell is due to the admixture of rotten coconuts in the extraction of oil. If sound ones are selected for extracting oil, it will no doubt be good. But the oil obtained in the following way will be the best owing to its freshness and the aromatic smell. Take four or five well ripened coconuts and break them in two. By means of a scratcher scratch the copra inside. Put in a handful of rice and grind it well in a mortar to the consistency of a meal, when it will be seen that the butter present therein will separate itself on the surface and could be collected in a lump. This butter put into a pan on the oven and heated till the water contained therein is evaporated, will result in a fine aromatic oil or ghee. This oil is so delicious as to be used in place of ghee and most agreeable and effective to be used for the hair. This could be perfumed in order to make it more agreeable still. The fine product can be bottled and sold as coconut hair oil.

MODERN METHODS OF PREPARATION.

The whole secret of modern hair oils lies in using white oil as the base. This oil is coloured by either steeping alkanet roots to get a red colour or any other oil-soluble synthetic colour of the shade required. The last but not the least in importance is perfuming the oil. For this purpose oleum Neroli, oil of Roses, Jasmine, *Kewara* or any other concentrated oil is used to the best advantage. The oil thus obtained is bottled and sold. The method of preparation is easy enough but the efficacy depends upon any other admixture such as the extracts having the power to strengthen the roots of hair. No manufacturer takes the special care to make it efficacious but he is particular in making it agreeable in appearance, colour and perfume expecting some, who are themselves well versed in chemical line. However, I can

say that there are a few exceptions to the above general statement.

LIME AND GLYCERINE.

In this preparation, people are led to believe that there is the costly glycerine mixed; but it is not so. The theory that when lime is agitated with oil glycerine is formed is the basis of the preparation. When coconut oil is shaken with a proportion of lime water an emulsion is obtained and this emulsion, no doubt, contains a small proportion of glycerine formed of itself by chemical combination. This emulsion, when properly mixed and prepared will keep for a long time. The finish is given by adding some perfume and then bottling.

OTHER PREPARATIONS.

There are numberless other preparations finding place in the market and since they are all nothing but luxuries, I am not inclined to detail them. But, necessity rather than anything else prompts me to detail the mode of preparations for eradicating superfluous hair. These are being marketed in the form of powders, fluids and also soaps.

HAIR DEPILATORIES:—Instances are not wanting to prove that several hair destroyers in the shape of powders, pastes, fluids and even soaps are being sold in the market, but most of them are either ineffective by having become old and consequently lose their power or are accompanied with injurious effects of causing irritation on the spot used by disproportionate quantities of the constituents. It is an established fact that these depilatories are quite essential for removing superfluous hair and these articles are easily saleable. Further, this industry is such, as can be undertaken by any one of even ordinary means.

Barium Sulphide and other high grade chemicals are not available in every place and no importance is attached to an industry worked out of costly and not easily procurable articles. My object is

to give a simple process that might be handled by even a beginner easily. With this purpose in view, I attempt to deal with very cheap materials ensuring high profits. A cheap material by the name of orpiment is available in every bazaar drug shop. Its vernacular name is *Harital*. It is an arsenic compound with sulphur giving out sulphurous smell. This material, well-pounded and mixed with *chunam* (slaked lime), will change its colour from yellow to greenish white emitting a disagreeable smell of sulphuretted hydrogen. But this smell can be masked by the admixture of a little petrol, eucalyptus oil or even kerosine oil.

The proportion of orpiment should be half that of slaked lime. The paste obtained by these two materials has got the property of acting upon hair without injuring the skin. This paste when diluted with water and applied to the spot wherefrom hair is intended to be removed and allowed a quarter of an hour's soaking, will act well on the hair and when it is washed off, the hair is removed completely. Better results could be achieved by washing with a good soap.

HAIR-REMOVING SOAPS.—It is not necessary that in order to manufacture these soaps, one should be a soap manufacturer by profession. Any ordinary kind of washing soap with an excess of alkali can be re-melted over water bath and a proportionate quantity of well-pounded orpiment mixed up with a little water and then moulded into cakes. The excess of alkali in the soap is intended to take the place of *chunam* required for the purpose of creating the action. These soaps are also selling in the market.

FLUIDS.—By mixing watery *chunam* and orpiment slightly yellowish fluid of oily appearance is obtained when the mixture is allowed to set. The supernatant liquid is decanted and bottled. But this fluid, after a time naturally loses its effect.

—By Mr. K. R. Chakraverty.

IDEAS FOR SMALL CAPITALISTS.

WIRE APPARATUS FOR LABORATORY USE.

Mr. E. Lakkaraju Naidu, "Chemo-House," Kharida Bazar Road, Kharagpur sends us the following:—

Many thousands of our Indian youths are graduating from Indian Universities year after year and out of them many are B.Sc.'s. After graduating 99 per cent. of them seek for services and thus increase middle-class unemployment. Every student of science has seen and used many apparatuses in the laboratory and some of them are made of wire. If a little bit of common sense is used there is every possibility of making many of the apparatuses with wire. The diagrams show many of the wire apparatuses for Laboratory use.

For most of the apparatuses shown some oxidizable wire should be selected, such as brass or tinned iron and the tools required for forming these articles of wire consist of only a pair of cutting pliers, a pair of flat and a pair of round nosed pliers, a few cylindrical mandrels of wood or metal made in different sizes and a small bench vice. All the tools above noted do not cost more than Rs. 10. Any or all of the articles may be made in different sizes and of different gauges of wire for different purposes.

Fig. (1) shows a pair of hinged tongs, which are useful for handling coals about the furnace, for holding a coal or piece of pumice for blowpipe work, and for holding large test tubes and flasks as shown in (2). These tongs are made by first winding the wire of the other

half to form the joint, then bending each part at right angles, forming on one end of each a handle and upon the other end a ring. By changing the form of the ring end the tongs are adapted to handling crucibles and cupels and other things in a muffle.

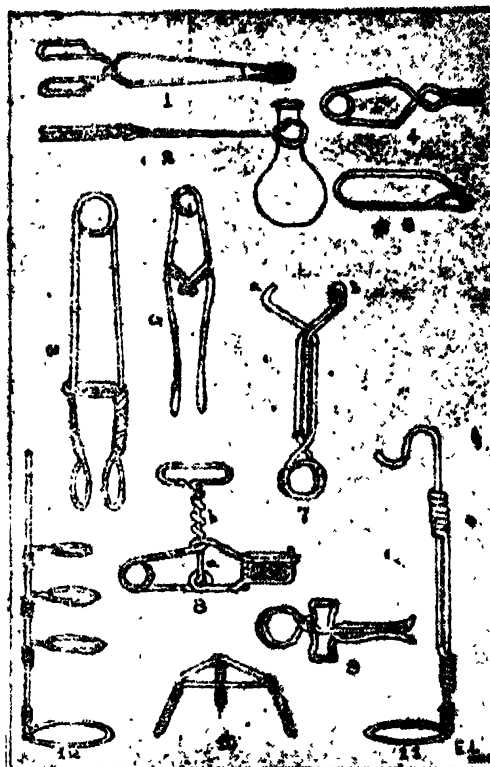


Fig. (3) shows a pair of spring tongs, the construction of which will be fully understood without explanation. It may be said, however, that the circular spring at the handle end is formed by wrapping the wire around any round object held in the vice; the rings at the opposite end are formed in the same way. The best way to form good curves in the wires is to bend them around some suitable mandrel or form.

Fig. (4) shows a spring clamp for holding work to be soldered or cement-

ed. It may also be used as a pinch cock.

Fig (5) represents a pair of tweezers, which should be made of good spring wire flattened at the ends. (6) is the clamp for mounting microscope slides, and for holding small objects to be cemented or soldered. (7) is a pinch cock for rubber tubing; its normal position is closed as shown in the diagram, but the end (a) is capable of engaging the loop (b), so as to hold the pinch cock open. (8) shows a clamp or pinch cock having a wire (a) hooked into an eye in one side, and extending through an eye in the other. This wire is bent at right angles at its outer end to engage a spiral (b), placed on it and acting as a screw. The open spiral is readily formed by wrapping two wires parallel to each other on the same mandrel, and then unscrewing one from the other. The handle will be formed by aid of pliers. (9) shows still another form of pinch cock. It is provided with two thumb-pieces, which are pressed when it is desired to open the jaws.

Fig. (10) is a tripod stand, formed by twisting three wires together. This stand is used for supporting various articles, such as a sand bath or evaporating dish, over a gas flame. It is also useful in supporting charcoal in blowpipe work and also flasks over a spirit lamp.

Fig. (11) shows a stand adjustable as to height for supporting the beak of a retort, or for holding glass conducting or condensing tubes in an inclined position. The retort or filter stand represented in (12) is shown clearly enough and requires no explanation. Should the friction of the spiral on the standard

ever become so slight as to permit the rings to slip down, the spirals may be bent laterally, so as to spring tightly against the standard. (13) shows an adjustable test tube holder, adapted to the standard shown in (12) and capable of being turned on a peculiar joint, so as to place the tube in any desired angle. The holder consists of a pair of spring tongs, having eyes for receiving the notched cork. One arm of the tongs is corrugated to retain the clamping ring in any position along the length of the tongs. The construction of the joint by which the tongs are supported from the slide on the standard is clearly shown. It consists of two spirals (a) and (b), the spiral (b) being made larger than the spiral (a), and screwed over it. The holder is very light, strong and convenient.

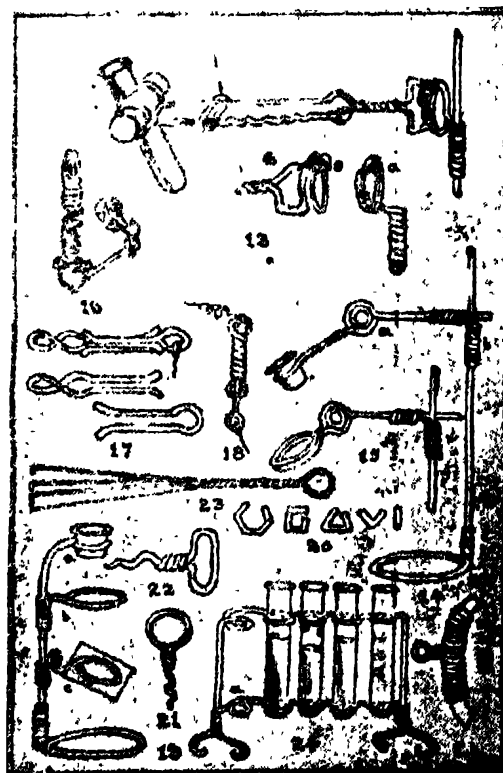


Fig. (14) represents a holder for a magnifier, which has a point (a) similar to the one just described. The slide (b) is formed by a spiral bent at right angles and off-set to admit of the two straight wires passing each other. The holder may be used to advantage by engravers and draughtsmen. (15) shows a holder for a microscope condenser, the difference between this and (14) being that the ring is made double to receive an unmounted lens.

Fig. (16) shows a Bunsen burner, formed of a common burner having a surrounding tube made of wire wound in a spiral, and drawn apart near the top of the burner to admit the air, which mingles with the gas before it is consumed at the upper end of the spiral.

Fig. (17) represents a connector for electrical wires, which explains itself. The part with a double loop may be attached to a fixed object by means of a screw. Another electrical connector is shown in (18) one part of which consists of a spiral having an eye at one end. The connection is made by inserting the straight end in the spiral. To increase the friction of the two parts either of them may be curved more or less.

A microscope stand is shown in (19). The magnifier is supported in the ring (a). The ring (b) supports the slide, and the double ring (c) receives a piece of looking-glass or polished metal, which serves as a reflector.

Fig. (20) shows a set of aluminium grain weights in common use. The straight wire is a 1 gr. weight, the one with a single bend is a 2 gr. weight, the one having two bends and forming a triangle is a 3 gr. weight and so on. (21) and (22) are cork-screws. It is a great convenience to have one of these little

occasionally, thus saving the trouble of cork-screws in every cork that is drawn frequently inserting and removing the cork-screw. The cork puller shown in (23) is old and well-known, but none the less useful for removing the corks that have been pushed into the bottle, and for holding a cloth or sponge for cleaning tubes, flasks etc.

A test tube stand is shown in (24). The wire is then formed into a series of loops, and twisted together to form legs. A very useful support for flexible tubes is shown in (25). It consists of a wire formed into a loop, and having its ends bent in opposite directions to form spirals. A rubber tube supported by this device cannot be bent so short as to injure it.

Most of the articles described above may be made to the best advantage from tinned wire, as it possesses sufficient stiffness to spring well, and at the same time is not so stiff as to prevent it from being bent into almost any desired form. Besides this the tin coating protects the wire from corrosion, and gives it a good appearance.

Do not let soup boil, but allow it to simmer slowly. Much of the liquid is wasted in evaporation, and the best of the flavour is lost if the soup boils or is heated too quickly.

Jugs in which milk is kept should be scoured with salt at least once a week.

To remove fruit stains from the hands moisten a crust of bread with vinegar and rub on the stains; or grease the hands with lard, and then wash with soap and water.

Cigarette ash makes an excellent polish for silver.

Small Trades & Recipes.

India Ink.*

Take 8 parts well-burnt lamp black, 64 parts water, 4 parts fine pulverised indigo, well rubbed up and boiled till the greater portion of the water is evaporated; then add 5 parts gum arabic, 2 parts bone-glue, 1 part extract of succory; boil till the mixture is as thick as paste, then mould in wooden forms, well greased with olive or almond-oil, in order to prevent adhesion. By using burnt peach kernels or cork, in place of ordinary lamp black, a finer quality may be given to the ink. The glue would better be left out and gum arabic substituted. The mass is then pressed into flat cakes weighing from one to two pounds, and left to ripen for a couple of days, after which it is formed into the customary shape. The moulder takes for their purpose a piece of the dough, and warms it by means of a basin full of live coals, kneads it long enough in his hands and then fills the form, which he puts under a long lever, pressing it by his own weight, while in the meantime he works the next piece of the mass. The moulds are made of wood, and also the pistons on which are cut the letters. The lustre is produced by brushing the dried ink with a hard brush saturated with rosin, which also prevents the ink from blackening the fingers afterwards. The peculiar odour is derived from a small quantity of camphor or musk, which is incorporated with the warm dough. All ordinary inks are without it. The coloured letters

are painted on with a fine brush; the gold and silver colours by suspending the finely divided metals in water to which has been added a little gelatine.

Face Cream.

	By parts
Quince seed	10
Boiling water	1000
Borax	5
Boric acid	5
Glycerine	100
Alcohol 94 per cent	125
Otto of rose	q.s.

Macerate the quince seed in half of the boiling water with frequent agitations, for 2 hours and 30 minutes, then strain off. In the residue of the boiling water dissolve the borax and boric acid, add the glycerine and the perfume, the latter dissolved in the alcohol. Now add, little by little, the colate of quince seed, under constant agitation, which should be kept up for 5 minutes after the last portion of the colate is added.

Pain Ointment.

An excellent pain-subduing ointment may be obtained by working the following formula.

	In oz.
Tincture of capsicum	5
" " camphor	1
Ammonia water	2
Alcohol	2
Soap liniment	2

INDIA'S INDUSTRIAL PROGRESS.

Industrial Research In Bengal.

The research work conducted at the Calcutta Research Tannery during 1924 was of special interest and comprised a variety of subject including tannage of sole leather, manufacture of box sides from dry salted cow hides and the tannage of lizard skins. Inconvenience, felt owing to the absence of a separate laboratory for industrial research will be removed on the completion of the Industrial Research Laboratory building, which is now in course of construction and where industrial problems relating to the utilisation of raw materials and manufacture of finished products will be investigated on a semi-manufacturing scale and demonstration in the improved process of manufacture given to the industrialists interested.

Improvement of Indian Cattle.

The subjoined notes summarised from the proceedings of the Cattle Conference at Pusa show the steps taken by the Board of Agriculture in India in developing animal husbandry and dairying.

At the Imperial Department of Agriculture, Pusa, cattle breeding operations have been directed along two lines; firstly, a herd of Sahiwals is being graded up by selective breeding and, secondly, cows of this herd are being crossed with

Ayrshire bulls of high milking pedigree. In addition, attention has been given to the transport of milk both by road and rail and to its subsequent sale and distribution.

In the Punjab, the definite policy of preserving and improving local breeds by a process of selection has been continued. In the Haryana and Dhani tracts cattle breeding schemes of great importance are being conducted. In several cases increased grants for this work have been given by the Government to the District Boards in these tracts. Cattle breeding grants to private breeders are being continued, the main difficulty being want of direction and supervision.

In the Bombay Presidency the work of the Agriculture Department is directed to the preservation and improvement of existing breeds and the production of good breeding bulls of each breed for distribution and use in tracts where they are required.

A decided awakening of interest in cattle breeding is noticeable through the agency of Taluka Development Associations, and several cattle breeding societies are in process of registration.

In Burma it is proposed to establish a small dairy at the Mandalay Agricultural College. This dairy will be used for giving simple instruction in dairying and for the staff and students of the College.

SCIENTIFIC AND TECHNICAL TOPICS.



Inhabitants On Mars.

Several scientists have come to the conclusion that Martians actually exist, and are a race not very different from our own. They are said to have proofs that Mars is in the condition that the earth is approaching—that is, desert.

Wind erosion has removed the mountains and mills and the seas have disappeared. The canals are not ditches nor water-courses, but vegetation on each side of conduits of water used as routes of travel.

These scientists also hope to prove that beings of an intelligence and a civilization far in advance of ours exist on Mars.

Theft-Proof Lamp.

A European firm is manufacturing a new type of incandescent lamp which is standard in every respect and resembles in appearance other incandescent lamps, but has the added feature that it cannot be removed from the socket without destroying it. The base is provided with an outer shell which is sealed to the inner shell. The outer shell is threaded to fit the socket, but the inner shell has no thread. After screwing the lamp into socket an additional turn breaks the seal between the shells and the lamp, then turns freely around in the socket without unscrewing. The only way to remove it then

is to break the glass and reach the outer shell and unscrew it. It is said to be theft-proof because no one would take a lamp, it is claimed, which cannot be used afterwards. This lamp is being made in all sizes, both vacuum and gas-filled, and is said to cost no more than other lamps without the theft-proof features.

Food From Trees.

In Sierra Leone grows the cream-fruit tree, the fruit of which has the taste of cream and is very agreeable to the palate. In Ceylon there is a bread-fruit tree from which a type of bread is made. It is said to compare favourably with the ordinary article.

In South America is found a milk tree, and a tree that grows in Sumatra is known as the vegetable tallow tree. Excellent candles are made from the berries of another tree which grows in South Africa and the Azores.

Meals For Sponges.

One of the hardest things to believe is that the sponge we use daily was once an animal, and not a vegetable growth of the ocean. Sponges live their own lives and eat their food as other animals do.

The separate existence of a sponge begins with the breaking away from the parent of a tiny particle. The latter, after being whirled about for a time by

tides and current, eventually attaches itself to a piece of rock, and from that home it seeks its own livelihood.

The food of infant sponges consists of yelk cells, which contain a form of nourishment. Later, as the sponge grows, it requires something more solid, and this is brought by the currents, which sweep into a bag—half-mouth, half-stomach—minute particles of the new food.

Varieties Of Fatigue.

There are many varieties of fatigue. There is that which results in a short time from extremely violent effort: this type is fairly well understood; there is the fatigue, which may be called exhaustion, which overcomes the body when an effort of more moderate intensity is continued for a long time. Both of these may be defined as muscular. Then there is the kind which we may describe as due to wear-and-tear of the body as a whole, to blisters, soreness, stiffness, nervous exhaustion, metabolic changes and disturbances, sleeplessness, and similar factors, which may affect an individual long before his muscular system has given out. Of these three forms of fatigue the first one only is as yet susceptible of exact measurement and description. The second type may quite possibly come within the range of experiment at no distant date. The third type is still so indefinite and complex that one cannot hope at present to define it accurately and to measure it. Undoubtedly, however, all these types of what we call 'fatigue' influence—indeed, determine—the results which are to be presented.

Mining A Meteor.

An attempt was recently made to locate the biggest meteor that has ever fallen in the earth, which is believed to be buried beneath the eminence known as Coon Butte, in Arizona.

It is now reported that all round the eminence the ground is covered with fragments of meteoric iron, embedded in which have been found many microscopic diamonds, and the belief that the main mass of the meteor contains diamonds and valuable metals led recently to the formation of a syndicate, which acquired the right of excavating the meteor.

Shortly after beginning operations at Coon Butte an enormous mass of meteoric iron was located 1,400 ft. below the surface, and reliable estimates of the size of the meteor suggest that it was really comparable to a minor planet and that it weighs at least 1,000,000,000 tons.

Samples of the meteoric body have now been subjected to expert examination, and they have yielded, in addition to a number of small diamonds, one ounce of platinum to every five tons.

One-fifth of an ounce of platinum per ton may seem a very small amount, but it is really quite a big proportion. Platinum is one of the rarest of metals and averages only about $1\frac{1}{2}$ cwt. per ton of the ores in which it is found, or barely one-third the amount found in the Arizona meteor.

If platinum is distributed throughout the 1,000,000,000 tons of the meteor at an average proportion of one-fifth of an ounce per ton, it must contain altogether well over 5,500 tons of that valuable metal, the value of which at the present price of platinum—about £24 an ounce—is some £4,800,000,000.

Shafts are now being sunk around Coon Butte in connexion with the most remarkable and what, it is hoped, will prove the most profitable mining operations ever carried out anywhere on the earth.

FORMULAS, PROCESSES & ANSWERS.

Deodar Oil.

2326 P. N. K., Balote.—Is curious to know how deodar oil is extracted.

Deodar is a kind of Cedar. The oil is obtained by distillation from the shavings of the wood. It consists of two hydrocarbons, one a volatile liquid and the other a solid crystalline compound containing oxygen. At an ordinary temperature cedar oil is a white crystalline body of the consistency of butter. The actual volatile oil separated by pressing is colourless, very limpid, and solidifies only at a very low temperature but readily resinifies on exposure to the air. On account of its agreeable odour it is frequently used in perfumery.

Uses of Chalk.

2404 A. B. C., Dikrong.—Wishes to be enlightened on the various uses of chalk.

The uses of chalk are numerous. For example, as a writing material in form of white and coloured crayons; for the manufacture of quick lime mortar, Portland cement, plaster, etc., and as a fertiliser. Powdered chalk is an essential ingredient of tooth powder. Whiting is prepared by grinding chalk and collecting the finer sediments from water; this is used for polishing, making putty, and many other purposes. Under the name of "Paris White" chalk is used in the manufacture of India-rubber goods

oil-cloth, wall paper, etc. The harder kinds are extensively used as a building stone.

Eucalyptus Oil.

2505 J. R. D. K., Gujranwala.—Wants to know how eucalyptus oil is prepared.

Eucalyptus oil is derived from various species of Eucalyptus, the genus, comprising some 140 known species. They are especially notable for their extraordinary fever-destroying properties.

The species known as Eucalyptus Globulus is, however, the most important. The oil is obtained by distillation with steam.

Eucalyptus oil from E. Globulus is chiefly used for medicinal purposes, but is also employed in perfumery.

Gold-Copper Alloys.

2559 U. E. Matara.—Desires to know how gold-copper alloys are prepared.

Gold and copper have great mutual affinity, and may be alloyed in all proportions. The alloys are harder and more fusible than gold alone. Copper diminishes the ductility of gold when it enters into the combination in a proportion over 10 to 12 per cent. The specific gravity of an alloy of gold and copper is less than the average of the two metals. The colour of the alloy varies between dark yellow and red, according

to the quantity of copper. Pure copper must be used in the preparation of the alloys, as the impure metal alters the malleability of gold and may render it brittle.

Colour Of Brass.

2455 M. C., Calcutta.—Writes, how colour of brass can be altered.

Generally speaking, it may be said that with an increase in the copper content the colour inclines more towards a golden, the malleability and softness of the alloy being increased at the same time. With an increase in the zinc contents the colour becomes lighter and lighter, and finally shades into a grayish-white, while the alloys become more fusible, brittle and at the same time harder. Just as different as are the properties of the respective alloys so is the cost of production, the price of brass increasing with the greater copper content. Extensive investigations have been made into the effect of additions of zinc on the colour of copper. Thus, the addition of 5 per cent. of zinc affects the red colour of copper very little; when 10 per cent. is added the colour becomes a true bronze; with 15 per cent. a light orange shade; with 20 per cent. a green yellow; from 20 to 25 per cent the colour changes very little, and these alloys are included under the term "green gold." Brass with 30 per cent. zinc has the true yellow brass colour, and this is continued to 35 per cent. zinc; at 38 per cent. the colour begins to change again from yellow to a reddish-yellow shade; at 45 per cent the colour is a rich golden; at 55 per cent the colour resembles 14-carats

gold; at 60 per cent the brass begins to whiten, and the alloys get brittle and are of no value for castings.

White Alabaster Soap.

2452 D. D., Bannu.—Wants a recipe of white alabaster soap.

Take stearin $6\frac{1}{2}$ lb., coconut oil 11 lb., glycerine $6\frac{1}{2}$ lb., lye (38 degree Be') 9 lb., alcohol (90 per cent.) 13 lb. The stearin and coconut oil are saponified by heating with the lye to 178 degree F. Afterwards add the alcohol, and then the glycerine. When the soap has become clear, allow it to cool to 133 degree F. It may be perfumed with 2 oz. of oil of bergamot, $\frac{1}{2}$ oz. of geranium oil, 7 dr. of oil of neroli, and $\frac{1}{2}$ oz. of oil of lemon.

Cleaning Aluminium Utensils.

2447 D. T. S., Agra.—Asks how aluminium utensils are cleaned.

If an aluminium utensil is put away dirty in a damp place it may in time darken, and this darkening is largely due to the accumulation of dirt, etc., and to some extent also to chemical action upon the metal itself. But discolouration is avoided by occasional washing and rubbing. Wash each utensil in hot water and plenty of soapsuds, dry it with a cloth, and place it empty on a hot (but expired) oven for a few minutes to dry quickly and thoroughly. Do not boil ashes, lye, or alkalies, such as soda potash, ammonia, etc. in an aluminium utensil, as these substances attack the metal and blacken it, and water containing any of them will affect the utensils in a similar manner. Should the aluminium become discoloured, the fault lies with the water

used. This discolouration may be prevented by using water which has previously been well boiled. The insides of aluminium utensils may when necessary, be scoured with special preparations.

Galvanising Process.

2572 R. E. R., Madras.—Desires to be enlightened on galvanising process.

The iron articles to be galvanised are dipped in dilute acid, hydrochloric, sulphuric, or nitric. This is done in order to expose a fresh metallic surface, and the resultant diminution of strength is infinitesimal. The usual system of galvanising consist of dipping the article, after it has been cleaned by dipping in acid as described above, in a bath of molten zinc; or in some cases, the iron is first tinned by a solution of chloride of tin, and the plate so prepared is passed through molten zinc. By the last method the zinc is deposited in a crystallised condition.

Brunswick Blue.

2438. M. S., Hyderabad.—Writes, What is Brunswick blue?

Brunswick blue generally consists simply of barytes, or gypsum, or china clay, coloured by a small percentage of Prussian blue, with or without the addition of a lesser proportion of ultramarine. The barytes or other base is very thoroughly agitated in water, while a solution of green copperas and a solution of yellow prussiate are gradually added without ceasing the agitation. When the incorporation of the ingredients has been completely accomplished, the precipitate is settled, washed, filtered, and dried. A few recipes are added.

PALE.

Barytes	1 cwt.
Green copperas	1 lb.
Yellow prussiate	1 lb.

MEDIUM.

Barytes	1 cwt.
Green copperas	3 lbs.
Yellow prussiate	3 lbs.

DEEP.

Barytes	1 cwt.
Green copperas	5 lbs.
Yellow prussiate	5 lbs.

In each case about 50-60 gallons of water are required.

Clarifying Fat.

2323. I. I., Pudukotah.—Writes how to clarify fat.

For clarifying fats used for frying, a tall jacketed copper cylinder, through which steam can be passed, will be necessary. If the fat is merely turbid from finely divided burnt particles, it will simply be necessary to filter it; but should further purification be required, then the means for doing this would have to be considered. Fat for culinary purposes should not be treated with chemicals, all that is necessary is to add about 1 oz. of fuller's earth for each pound of the melted fat, stir it well in, and then allow it to subside in the jacketed cylinder; but before this is done the filtration should be tried. An efficient filter may be made from a hoop of metal fitting tightly within the cylinder, which is suitably supported and provided with a lid, and resting on three supports soldered on the cylinder at about half its height. The hoop should be loosely

covered with flannel, which will hang down in the centre.

The melted fat should be poured on the flannel and will pass through it into the lower part of the cylinder, from which it may be drawn by a cock. An inlet pipe may be inserted near the top, if desired.

Manufacture of Blacks.

1768. P. K. R., Madura.—Requests us to publish how various kinds of blacks are manufactured.

(1) Carbon black' is a name which has been given in Great Britain to a fine lamp black; in America the black sold under this name is made from the natural gas which is found in large quantities in and near Pittsburg, by burning it under cooled vessels upon which the black deposits like soot.

(2) Lamp black is one of the most valuable of the black pigments; it consists, essentially, of carbon in a very fine state of division, and is prepared by burning oils of various kinds in a lamp burner, or by other means, in such a way that incomplete combustion takes place and a large volume of smoke is produced; this smoke consists of unburnt particles of carbon and is collected in a specially constructed system of flues. There are some differences in the quality of lamp blacks as heavy and light lamp blacks which varieties depend upon the position in the flues from which the black is collected—that deposited nearest the burning oil being heavier and less pure than that farthest away.

(3) Vegetable black is the name given to a very light variety of lamp

black collected in the chambers at the farthest point from the oil furnace. It is almost pure carbon, containing but a small proportion of moisture and occluded gases.

Preparation of Camphor.

2548. S. N. T., Ghoramara.—Wishes to know how camphor is prepared.

Commercial camphor is derived exclusively from the two plants, the *Cinnamomum Camphora* and the *Dryobalanops Camphora*. In Japan and Formosa the drug is obtained chiefly from the root trunk, and branches by the process of sublimation, but in the American plantations the leaves and small twigs are utilised, thus avoiding injury to the trees. Only the older trees are employed; indeed, it is said that a tree must be fifty years old before it should be considered available. The trees are marked in the forest after investigation by an expert, the lower part of the trunk, with roots, chopped up in small fragments, and some form of heat applied. In Japan the chips are said to be placed with a little water in iron vessels, surmounted by earthenware capitals furnished with a lining of rice straw. A moderate heat is then applied and the camphor, volatilised by the steam rises into the capital, where it is condensed upon the straw. In China the communitd plant is said to be first boiled with water until the camphor adheres to the stick used in stirring, when the strained liquor is allowed to cool, and the camphor which concretes, being alternated with layers of earth, is submitted to sublimation. In the island of Formosa, where the cam-

phor tree abounds the chips are heated in a rough still. This is usually composed of a furnace surmounted with a trough or similar rude vessel, which is protected by clay. In this reservoir the chips are placed, with water upon them, and a perforated board luted upon the top: on this are set earthenware pots. A fire having been lighted, steam rises through the chips and carries the camphor with it to deposit it in the pots.

White Coconut Oil Soap.

1996. G. C. M., Dacca.—Wants a good recipe of white soap with coconut oil only.

The materials are taken in the following proportions; 2072 lbs. of coconut oil; 168 lbs. of olive or other sweet oil, or tallow; 325 gallons of soda ley 24 degree Be., and 60 gallons of potash ley at 20 degree Be. The coconut oil, tallow or oil, as the case may be, are first put into the pan, and heat applied. About 10 gallons of the soda ley is then added, and when the whole materials are united, the same quantity of soda ley is then added, from time to time, with continued boiling, care being taken that each portion of ley is well combined with the fatty matters before the next is applied. As soon as the whole of the soda ley has been used, the boiling is kept up for about half an hour. The potash ley is then added, gradually, as before, and when the whole quantity has been used the boiling is kept up for about fifteen minutes, after which about 48 lbs. of common salt are sprinkled slowly over the mass, this operation occupying about a quarter of an hour the boiling is then

continued for about half an hour, after which the steam is turned off, or the fire drawn, as the case may be.

It is then allowed to cool down, and is afterwards cleansed or framed in the usual way. The potash ley is employed with the soda ley only for the finer qualities of soap.

Of the vegetable oils used in making soap, olive oil, palm oil and coconut oil are more commonly known. Castor oil is capable of forming soap with caustic alkalies, but is always used in combination with other fatty matters for this purpose. Among the other vegetable fixed oils used in soap making may be mentioned the oils of hemp seed, rape seed, cotton seed, poppy, linseed, sesamum, colza, beechnut, etc.

Poppy Seed Oil.

2244. L. D. S., Jhalrapatan.—Enquires how to extract poppy seed oil.

Poppy seed oil is prepared by crushing and pressing or extracting the seeds. The poppy heads are opened when they have reached a certain degree of dryness, and their contents emptied on to a plate of sheet iron, then winnowed to remove fragments of the capsule, and afterwards ground to a kind of meal. This is packed in bags made of ticking, and pressed, the oil being caught in tubs, wherein it is left to settle and clarify thoroughly, and is then ready for sale. By cold and warm pressure two qualities of oil are obtained. The first pressure gives the white oil and the second pressure the red oil, which can also be directly obtained by heating seed of poor quality.

It is used for edible purposes like olive oil and fat. Its technical uses are in the manufacture of soaps, as lamp oil, and as a matrix for colours in oil paint and colour making.

Printing Varnish.

2424. P. T. M., Meerut.—Wants to learn the process of preparing printing varnish.

Place one and a half gallons of linseed oil in an iron pot and make a fire under it. After a time the oil simmers and bubbles up, but as the temperature increases the surface resumes placidity; next it commences to smoke, and then to boil, emitting a very strong odour. As the boiling continues a scum arises. At this stage repeated tests should be made to see if the vapours will ignite. When they will do so, the pot is removed from the fire and placed on the ground. In the meantime the contents are very frequently stirred and kept burning. Samples are occasionally withdrawn to test the consistency of the varnish, for which purpose the flames must be extinguished by covering the pot. When drops of the varnish, after cooling, will draw out into strings about half an inch long it is suitable for an average letter press printing ink, and the flames are finally extinguished. This completes the varnish, but it is customary to add other ingredients, which may or may not enhance its value for printing purposes. On removing the lid of the pot there is much frothing and a great escape of pungent smoke. The froth will subside after a thorough stirring, upon which six pounds of rosin are gradually introduced

and stirred in. When rosin is dissolved one and a half pounds of brown soap is cut into slices and stirred in piece by piece. When all the soap is in and the frothing once more ceases the pot is returned to the fire until its contents begin to boil, constant stirring being maintained. This completes the operation.

Indigo and Sulphuric Acid.

1805. T. B., Pilibhit.—Desires to learn the action of indigo on sulphuric acid.

Indigotin is the true colouring matter of indigo, from which it may be prepared in a variety of ways. Concentrated sulphuric acid completely dissolves indigotin, sulphonation occurring. The mono-sulphonic acid also known as sulphopurpuric acid, is obtained by mixing 1 part of indigotin with 4 parts of concentrated sulphuric acid, and allowing the mixture to stand for half an hour. On diluting with water a fine purplish-blue precipitate is formed, which is slightly soluble in water has been used in dyeing under the name of 'indigo purple' or 'red indigo carmine.'

Indigotin disulphonic acid also known as sulphindigotic acid, is produced by the further action of sulphuric acid, 1 part of indigotin being heated to 90 degree for half an hour with 10 to 12 parts of concentrated sulphuric acid. On diluting with water any mono-sulphonic acid present is precipitated. The disulphonic acid may be purified by adding a saturated solution of common salt, which causes a precipitate of sodium disulphindigotate. It forms an insoluble lead compound from which the free acid may be separated by hydrogen sulphide.

QUESTIONS AND ANSWERS.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

2367 C. C., Trichinopoly.—For rapid sale of articles you deal in, advertise in pages of newspapers and periodicals.

2368 S. C. H. Sukkur.—Thanks for your suggestion. The publication of other industrial books from this office are in contemplation.

2369 M. P. S., Jhansi.—Industrial books may be bought of Chakraverty Chatterjee & Co. Ltd., 15, College Sqr., Calcutta.

2370 B. M. B., Barpara.—A complete list of Indian goods importers in Mesopotamia, Basra and Persia appeared in March 1924, issue of **Commercial India** the sister journal of **Industry**. The following is the list of tailors as required by you: John Mahomed & Co., 66, Medows St., Bombay, Kasim Sait & Co., North Gate, Curzon Park, Mysore; Lalbagh Tailoring & Hosiery Knitting Co., The Tambur Khanna, Lucknow; Mukherjee & Co., Aminabad Park, Lucknow; Burmese Favourite Co., Sule Pagoda Road, Rangoon; U. Myin & Co., 263, Dalhousie St., Rangoon; Ball Moody & Co., Quetta and D. Byramji, 74, Medows Street, Fort, Bombay. For selling buttons you may correspond with the following hosiery factories: Bombay Eastern Hosiery Works, 60 & 3 Abdul Rehman Street, Bombay; Coronation Woollen Factory, The Parel, Bombay; Andhra Knitting Factory, 220, Chinabazar Road, Madras; Ahmedabad Hosiery Factory, Outside Raipur Gate, Ahmedabad; Gujrat Hosiery Factory, near Astodia Gate, Ahmedabad; Frontier Hosiery Factory, Srinagar, Kashmir; Aryan Hosiery Factory Bangalore; Oudh Hosiery Works, 32 La Touche Road, Lucknow and Agra Knitting Works, The Pathwari, Agra.

2372 T. S. R. N., Masulipatam.—Chemicals required may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta and Calcutta Chemical Co., Panditia Road, Ballygunge, Calcutta.

2374 I. N. K., Madras.—Wants to be introduced to agents of Swallow mark blue-black ink. Knitting Machines may be supplied by Genz Wheeler & Co., 15, Clive Row, Calcutta.

2376 D. A. R. D., Colombo.—Directories are published by Thacker Spink & Co., 3, Esplanade East, Calcutta; The Kanara Press, Madras; London Directory, 25, Abchurch Lane, London, E. C. 4. and Kelly's Directory Ltd., 182-84, High Holborn, London, W.C.

2378 D. S. C., Rasra.—Dietz lanterns may be had of Elliot & Co., 6A, Clive Row, Calcutta. German hurricane lanterns may be bought of G. F. Rocek & Co., 111, Radha Bazar Street, Calcutta. For Indian hosiery goods refer to No 2370 above. Various kinds of German novelties may be supplied by Laurel Novelty Co., 43, Park Street, Calcutta.

2379 K. K. G., Palampur.—You may consult Soap Manufacture by George Hurst.

2380 M. G. A. Kharar.—Molasses are called *gur* and copal gum is called *chund ras* in Urdu. Recipe of pain balm appeared in October, 1921 issue.

2381 G. N. G. S., Sirsa.—Magic lanterns may be bought of K. B. Nan, 233, Old China Bazar Street, Calcutta. For cinema machines write to Calcutta Camera House, 159, Dharamtala Street, Calcutta.

2383 M. C., Khaur.—Stammering is cured by S. C. Banerjee, Deaf & Dumb School, 293 Upper Circular Road, Calcutta.

2384 T. R. V., Trichur.—An article on match manufacture and its possibilities appeared in July 1922 issue. Recipe and estimate of starting a factory will be found in September 1923 issue.

2387 R. N. S., Calcutta.—For enamelled jewellery write to Goonamal Parsram, 21, Park St., Calcutta; Mangal Deb Dhanpat Rai & Co., Multan City; N. Gupta & Sons, 5, Gupta's Lane,

Calcutta and Paul & Co., 72, Harrison Road, Calcutta.

2388 G. B., Malda.—Electric batteries may be had of McLawrie & Co., 17, Ezra Street, Calcutta.

2389 J. R., Rajshahy.—One minute camera may be bought of E. M. Solomon & Co., 3, Kenderdine Lane, Calcutta. For particular of vinegar correspond direct with the writer of the article. Method of preparing yeast will appear in an early issue.

2391 G. S. S., Jalpaiguri.—Home printers may be supplied by S. C. Dutt & B. K. Dutt, 100, Durga Charan Mitter Street, Calcutta.

2396 M. N. D., Calcutta—Free and early application of a weak solution of soda or potash and the subsequent application of the solution of alum is recommended for removing blood stains from cotton fabrics. Stains of red aniline ink may be removed by moistening the spot with strong alcohol acidulated with nitric acid. Unless the stain is produced by eosine, it disappears without difficulty.

2399 K. V., Baroda—A list of technical institutes in the Madras Presidency appeared in the last issue under No. 2305. For learning electrical engineering by correspondence write to International Correspondence School, Box 3995, Scranton, Pennsylvania, U. S. A., and Oxford Correspondence College Ltd, St. Giles, Oxford, England. Furniture may be bought of Dewjee Canjee & Co., Chakla Street and E. Wimbridge & Co., Charni Road; both of Bombay. It is not possible to give addresses of all technical journals of foreign countries, some of them are given below: Amateur Mechanic, 41 South Castle Street, Liverpool; Analyst, 2 Orange Street, London, W. C. 2; Architectural Journal, 9 Conduit Street, Regent Street, London W 1; Bioscope, 85 Shaftesbury Avenue, London W1; Chemistry and Industry, 46-47, Finsbury Sqr., London E. C. 2 and Design and Industry, Kingfisher Press Ltd., 27, Southampton Street, London W. C. 2 and Handicrafts, Odhams Press Ltd., 85-94, Long Acre, London W. C. 2.

2400 G. S. C., Jalgaon.—A distillation plant for essential oil can be supplied as per order

by The Oriental Machinery Supply Agency, 201, Lal Bazar Street, Calcutta.

2401 P. C. N., Birsingpur.—For books on watch and clock repairing enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta.

2404 T. S. R. C., Ayikudi.—For repairing watches you may enquire of our advertiser L. Bysack & Co., 5, Old Court House Corner, or of West End Watch Co., 20, Dalhousie Square; both of Calcutta. You may write to various Government offices with your references for securing good services as Government gives special privileges to war-service returned men. Technical books may be supplied by Book Co., 41A, College Square, Calcutta. For non-delivery of journal subscribed by you write direct to the publisher. Desires to buy saccharine. For casting horoscopes consult the astrologers amongst our advertisers.

2407 P. R. K. R., Rajahmundry.—For disposing of articles manufactured by you advertise in the pages of newspapers and periodicals. In the meantime you may correspond with the following firms whether they are disposed to take your articles or not: M. E. Dadabhoy & Sons, 55 Canning Street and Babhoobhai Ratilal & Co., 49, Ezra Street; both of Calcutta.

2408 P. P. A., Gudivada—To send post cards to foreign countries you have to affix one and a half anna stamp for each card. You can send your remittances by foreign money orders, British Postal Orders and by buying bank draft. For detailed information of the subject you are referred to August, September, October, November and December (1925) issues of **Commercial India** where series of articles on foreign remittances appeared. For independent profession you may start business of your own.

2410 R. L. N. S., Bikkavole.—Iridium may be bought of Calcutta Mineral Supply Agency Ltd., 31 Jackson Lane, Calcutta. Process of depositing iridium point at the end of fountain pen appeared in September 1922 issues of **Industry**. Sago is a kind of seed obtained from the stems of various palms particularly those of the general *sagus* and *saguerus*. It

is obtained by cutting and splitting the palm-stem and washing with water. For unemployment you are referred to an article on the subject that appeared in the last issue of **Industry**. For sericulture consult an expert.

2411 V. I. R., Cuddapah.—Manufacture of canvas and paper involves many higher technicalities requiring installation of big machineries and plants. Hence it will be advisable for you to consult experts on the subjects. Medical books may be supplied by Butterworth & Co., 8 Hastings Street, Calcutta.

2412 N. V. V. R. K' R., Cocanada.—The following firms deal in patent and other medicines: B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta; Martin & Harris, 8 Waterloo Street, Calcutta; Dawn & Co., 28 Sannomiyacho, 3 Chome, Kobe, Japan; Julius Grossmann, Catharinenstrasse 8 Hamburg, Germany and L. Rozen & Co., 36 & 37 Mincing Lane, London E. C. 3.

2413 A. C. A., Masulipatam.—Harmoniums may be supplied by National Harmonium Co., Mercantile Bldgs., Lall Bazar and Dwarkin & 8A, Lall Bazar Street; N. B. Sen & Bros., Sons, 8 Dalhousie Square, all of Calcutta.

2414 H. R. R., Holur.—The Reply to your queries appeared in November 1925 issues in Brief Queries and Replies column under No. 2035.

2416 G. M. S., Bagalkot.—Recipes of manufacturing glass on a small scale appeared in December 1925 issue of **Industry**. For starting a glass factory only book knowledge will be of little use to you. It will be advisable for you to consult a glass expert who will supply you with all the necessary information. The machineries required may be indented by Oriental Machinery Supply Agency Ltd, 201, Lall Bazar Street Calcutta on your behalf.

2417 D. R. P., Tirutraipundi.—Fancy glass bottles may be supplied by Adolf Lacotta G. m. b. H., Ruchengartenstrasse 2, Leipzig and Theodor Eismann, Bayersche Strasse 28, Leipzig; both of Germany; Mizuochi & Co., 75 Nichome, Kita Kyuhōjimachi, Higashi-ku, Kyoto Japan and Kasai Brothers & Co., 2 Chome, Sonnomigacho, Kobe, Japan. Perfumes may be supplied by Morean & Cie, 48 r Condorect,

Paris and A. Schuhl & Cie 9 bd. de la Kadebine Paris, both of France.

2419 C. K. G. I., Malabar.—Recipes of pyrotechnics appeared in September 1925 issue. An article on perfumery preparation appeared in September 1924 issue. Please write clearly your requirement regarding market quotations.

2420 K. V. L. C., Salem.—Textile machinery may be supplied by W. H. Brady & Co. Ltd., Royal Insurance Bldgs., Churchgate Street; Fort and H. M. Mehta & Co., 123, Esplanade Sorabjee Shapurjee & Co., 303 Hornby Road, Fort; all of Bombay.

2421 S. K. A., Ambala City.—Kerosene oil may be made odourless by shaking it first with 200 grains of chlorinated lime for over 9 litres, adding a little hydrochloric acid, then transferring the liquid vessel containing lime, and again shaking until the chlorine is removed. After allowing the materials to subside the clear kerosene oil is decanted and stored away. Zambuk is a patent medicine hence its recipe is not known.

2422 N. T. B., Timarni.—For Derby tickets enquire of Secretary, Royal Calcutta Turf Club, 13 Russel Street, Calcutta.

2426 N. K. B., Bhind.—Cinema films and apparatus may be supplied by Calcutta Camera House, Chowringhee, Calcutta.

2427 G. S., Kotah.—Wants to be put in touch with dealers in fruit and grain.

2428 S. K. P. T., Madura.—For preparing hair oils on a commercial scale you may go through the booklet Manufacture of Hair Oils published from this Office.

2429 E. C. W., Dhamangaon.—For printing calendars you may write to Calcutta Fine Art Cottage 76 Dharamtala Street; Mohila Press, 29 Pataldanga Street and Calcutta Fine Art

SETT DEY & Co

ORIGINAL HOMEOPHARMACISTS,
42, Strand Road, Calcutta.

Dealers in Original Homoeopathic dilutions
and Biochemic Triturations.
Catalogue Free on Application.

Printing Syndicate, 147 Baranosi Ghosh Street; all of Calcutta. Essences may be supplied by P. Mukherjee & Co., 29 College Street Market and B. K. Paul & Co., 1-3 Bonfields Lane, both of Calcutta.

2431 A. K. B. Giridih.—To communicate with any querist, write him with number and initials under care of **Industry**, when your letters will be duly redirected.

2432 M. J., Buldana.—Formula of bar soap appeared in August 1921 issue.

2433 I. D. M., Peshawar City.—An article on candle making appeared in December 1922 issue.

2434 A. Q. A., Hoshangabad.—Maps may be supplied by Central Book Depot, 6 Hastings Street, Calcutta.

2435 J. N., Gujranwala.—Process of preparing washing soda appeared in July 1924 issue. Process of preparing caustic soda will be found in July 1922 issue. Ammonia is a kind of chemical and is the compound of nitrogen and hydrogen. This may be bought of B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta.

2436 M. D. M., Karhal.—It is advisable for you to make experiment in technological laboratory.

2439 G. S. S. C., Yoval.—Homeopathy is not recognised by Government. But there are many homeopathic practitioners of repute at Calcutta. For learning homeopathy by correspondence write to the Principal, C. H. Medical College, 104, Cornwallis Street, Calcutta. Candle making appliances may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta who will also supply you with estimate for starting a factory on a small scale. Dentistry is taught at the Calcutta Dental College and Hospital, 261 Bow Bazar Street,

Calcutta. Soda water machines may be bought of Amin Chand Mehra & Sons, 34 Armenian Street and Little & Co., 3, Grants Lane, both of Calcutta. You may use eardrum which may be supplied by B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta.

2440 B. N., Mandalay.—Synthetic emerald is still in its experimental stage and it has not yet been put in markets.

2442 S. P. W., Salur.—Recipes of stencil ink appeared in January 1922 issue. For photo enlargement you may write to W. Mangold, Brandenburgstrasse 58, Berlin and S. Sternl & Schiele Dresdenerstrasse 49 Berlin; both of Germany. Novelties may be supplied by M. Hanschild & Co., Berlin—Charlottenburg 5 and Lektor G. m. b. H., Schonhanter Allee 78, Berlin M 113; both of Germany. You perhaps mean capsule that may be bought of P. S. Dutta & Bros., 8 Ezra Street Calcutta. Electroblocks may be had of R. P. Ganguly & Co., 8, 9, 10, 11 Matisil Street and B. N. Byasack 1/1, Ramchand Ghose Lane, P. O. Berdon Street; both of Calcutta. For industrial and technical books enquire of Chackraverty Chatterjee & Co. Ltd., 15 College Square, Calcutta. Formulas of perfumes will be found in September 1924 issue of **Industry**. You may go through The Indian Boy published by Seva Samiti Scout Officers' Council, Meerut.

2446 T. B., Pilibhit.—Reply to your queries appears elsewhere in this issue.

2448 V. S. C. W., Agra.—Apparatus for filling rubber balloons may be bought of R. Khan & Sons, Chanda, C. P. Soaps may be bought of Calcutta Soap Works, 15 College Square, Calcutta. Chemicals may be bought of B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta. Paints may be supplied by Murarka Paint & Varnish Works, Sodepur, 24 Parganas E. B. Ry., and Pioneer Indian Paint & Oil Works Co. Ltd., Bombay suburban. Boot polish may be had of Chandra Bros, 89 Bentinck Street, Calcutta.

2449 M. H. Y., Sagajng.—If you use the spent lye the product will be of inferior quality.

2450 M. P. B., Kanauj.—For halftone copper and zinc sheets enquire of Calcutta Fine Art

LIMITATION OF FAMILY.

Third Ed. 5 Portraits, 55, Engravings.
357 Pages, Price Rs. 3. Postage Extra.

A comprehensive and Confidential Treatise of children according to his health and means. Every parent desiring to regulate the number will find it a God-send. Ask for table of detailed contents which will be sent free.

K. M. DAS & CO.,

29-1, Telepara, Sampooker St., Calcutta.

Syndicate, 147 Baranosi Ghose Street, Calcutta
Engraver's tools may be supplied by S. Bysack,
5 Old Court House Corner, Calcutta.

2451 H. R. S. S., Mysore.—Paper and stationery articles may be supplied by Nilmoney Haldar & Sons, 106 Radha Bazar Street and Ghosh Bros, 63 J. Radha Bazar Street; both of Calcutta. Sugar may be had of Ganesh & Co., 39 Thambu Chetty Street, Madras and Hajee Ajum Goolam Hassen & Co., 172 Nagdevi Street Bombay. Matches may be supplied by H. Rashid & Co., Zakariah Street, Calcutta. Bidi may be bought of Moolji Sicka & Co., 51 Ezra Street, Calcutta. Tobacco may be supplied by B. B. Pande & Sons, Katni. Biscuits may be had of P. Sett & Co., 13 Ram Narain Bhattacharjee Lane, Darjee Para, Calcutta.

2453 P. G. G., Puttur—There is no machine for removing the outer fibre of arecanuts.

2456 B. C. S., Raghunathpur—Lathes, oil engines and dynamos may be bought of Martin & Co., Clive Street, Calcutta. Bengali and Marathi films may be supplied by J. F. Madan & Co., 5 Dharamtala Street, Calcutta and Pathe Cinema Ltd., Pathe Bldg. Ballard Estate, Bombay.

2457 A. K. M., Howrah.—China clay generally contains a large percentage of quartz sand and mica and it is refined by washing. The workman breaks down the crumbling surface of the china clay rocks with a pick and then directs a stream of water over this to wash down the material, which is passed into tanks where the suspended water settles but the quartz clay and mica are deposited according to the sizes of the particles and so separated from each other. The china clay is allowed to dry to a stiff paste in the tanks and is then removed to the drying kilns, where it dries until it can be cut into blocks. It is then a soft friable, sectile, white substance possessing only a moderate plasticity when mixed with water. It is used in the manufacture of porcelain and white earthenware in paper-making and the filling of calico and also in the manufacture of alum, aluminium sulphate and ultramarine. The fine mica separated from

the china clay in the washing is used for weighting coarse papers, paper boards, etc. Garnet is a precious stone of which there are different kinds. The most valuable is the almandine, precious garnet or carbuncle. The common garnet differs from the other in being commonly opaque or only translucent; colour reddish, yellowish, greenish or blackish brown. It may be supplied by Williamson & Co, Oldham Road, Gaya. China clay may be had of Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta.

2458 K. P. S., Burdwan—Refer your query to the Director of Commercial Intelligence, 1 Council House Street, Calcutta.

2461 R. D., Lahore.—Heiko indicates name of trade mark. Heiko brand essences and perfumes may be bought of Sickri & Co., 55/8 Canning Street and Paradise Perfumery House, 75 Colabola Street, Calcutta. Process of extracting sandal oil appeared in February 1924 issue of **Industry**.

2462 K. T. S., I., Mysore.—Dissolve $\frac{1}{2}$ dr. sodium carbonate in 1 oz. water. Sweeten 1 quart milk with 1 lb. sugar. Add the milk to the water and boil down the whole to thickness. Spread the mass in a layer on a plate and hold over a slow oven. The mass will become crisp and can be easily powdered. The product will be good sweet milk powder.

2463 K. K. G., Cannanore.—For essences refer to No. 2461.



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**Silver Medals, Cups &
Shields.**

**Fine Silver Medals in
Velvet lined cases.
Rs. 3-12 each.**

Largest Stock & Variety.

Illustrated lists free.

CARR & MAHALANOBIS,

3/D, Chowringhee, Calcutta.

2464 J. N. M., Bitragunta.—For cultivating paddy and starting rice mill you may go through the following books. Handbook of *Indian Agriculture by G. N. Mukherjee; Food-grains of India by A. H. Church to be had of Chackraverty Chatterjee & Co. Ltd., 15 College Square, Calcutta, and The Milling of Rice in the Madras Presidency to be had of the Director of Industries, Madras.

2467 A. N. V. N., Madura.—Tin boxes may be supplied by Gajanand Rampratab, 6, Halsi Bagan Road, Calcutta and dies for tin boxes may be had of Dutt Engineering Works, Sett Bagan, Manicktala, Calcutta.

2468 H. E. M., Rangoon.—For the machine required enquire of Oriental Machinery Supply Agency Ltd., 201, Lall Bazar Street, Calcutta.

2469 M. I. S., Myingyan.—Wants to be introduced to dealers in groundnut, cotton, chillies and onions.

2470 S. Z. H., Arrah.—For securing suitable service go through the advertisement pages of dailies and apply for an appointment.

2472 E. T. C., Amritsar.—Glue is manufactured by B. Cannon & Co. Ltd., 110 Cannon Street, London E. C. 4 and A. C. Pearce & Co. Ltd., 7 Laurence Pountney Hill, London E.C. 4 Copal is a valuable and peculiar kind of resin that naturally exudes from a large tree found in various tropical countries. The best copal is hard and brittle, in rounded lumps, of a moderate size, easily reducible to a fine powder of a light lemon colour, beautifully transparent, but often like amber containing parts of insects and other small extraneous bodies in its substance. It may be bought of S. N. De, Post Box 7851, Calcutta.

2473 J. N. M., Jaipur City.—Refer your query to the Secretary, Institute of Civil engineers, George Street, Westminster, London S. W.

2476 P. L., Ralangi.—For electric treatment write to New Life Co, 196 Cornwallis Street, Calcutta.

2478 K. C., Bhawanipur.—Sulphur comes from Sicily and Japan.

2479 B. K. R., Mymensingh.—For Marathi books enquire of D. B. Taraporevala Sons & Co., 103 Meadows Street,, Fort Bombay.

2480 P. T. C., Lahore.—Wants to be put in touch with straw belt manufacturers.

2481 V. S. C., Bezwada.—Glass bottles may be supplied by S. Suzuki & Co., 2 Sanchome Honkokucho, Nihonbashi-ku, Tokyo, Japan; G. Swada, 45 Narihira-machi, Nakanogo, Hanjo-ku, Tokyo, Japan; United Glass Bottle Mnf. Ltd, 40/43 Norfolk Strand, Strand, London W. C. 2 and Bellaire Bottle Co., Bellaire, Ohio, U. S. A.

2482 R. B. S., Poona City.—Gum arabic cannot be bleached but you can employ gum tragacanth For prospects of Handloom industry please go through the special number of **Industry** on Home made Textiles (Oct. 1922) You may also consult the books published by Young India Office, Ahmedabad Gum Tragacanth possesses greater adhesive power than gum arabic.

2484 K. M. C. S., Sholinghur.—For selling articles manufactured by you advertise in the pages of newspaper and periodicals. For handbill distribution write to Calcutta Advertising Agency, 15, College Square, Calcutta.

2485 W. Y. C., Ajmer.—The reply to your queries appeared in September 1925 issue in Brief Queries and Replies column under No 1371.

2486 H. R., Hassan.—Gallnuts may be supplied by P. D. Marthenis de Silva, High St., Galle, Ceylon. The following is a list of oil companies of Rangoon.— (1) Attock Oil Co. Ltd., (2) Burma Oil Co. Ltd., (3) Standard Oil Co. of New York; (4) Abdulla Hajee Abba & Co., Merchant Street and (5) Yenangyang Oil Co. Ltd., Barr Street.

2487 A. R., Kotah.—Ice plant may be supplied by Burn & Co, 7, Hastings Street, Calcutta. Oil engines may be supplied by Alfred and Herberts Ltd., 12, British Indian Street, Calcutta.

2488 S. K. G., Rangoon.—Dairy appliances may be supplied by Jupiter Trading Agency, Mulji Jetha Market, Karachi. You may go through the following journals on dairy, (1) Dairy Man, Cowkeeper and Dairy Men's Journal, 43, Great Tower Street, London, E. C. 3; (2) Dairy published by J. D. Hand, 21,

Farringdon Avenue, London, E. C. 4; and (3) Dairy World published by W. Speaight & Sons Ltd., 98, Fetter Lane, London E. C. 4.

2490 T. R. C. M., Tinsukia.—Tin box making machinery may be supplied by E. W. Bliss & Co., Brooklyn, New York; Adriance Machine Works Inc., Brooklyn, New York and Niagara Machine & Tool Works, Buffalo, New York, all of U. S. A.

2491 K. P. P., Coimbatore.—Desires to buy corrugated straw board and ink fillers.

2492 R. S. M. P., Benares City.—For draw plates write to L. S. Starrett & Co., Athol, Massachusetts, U. S. A.; Arnold Luck & Co., Viernan, Thuringen, Germany; Badourcan & Jones Ltd., Poppen's Court, Fleet Street, E. C. 4; and Napier Saw Works Inc., Springfield, Massachusetts, U. S. A.; Artificial silk is manufactured by Harrison Gore Silk Co., Newburgh, New York, U. S. A. Wants to be put in touch with culture pearl merchants of Bombay and Calcutta.

2494 M. J., Poona City.—An article on rubber stamp making appeared in November 1923 issue.

2495 K. S. S. B. S., Madura Your enquiry is engaging our attention.

2496 D. R. D., Nagpur.—For coconut coir extracting machine write to the Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta. Coconut coir is largely found in Malabar Coast.

2497 S. R. G., Nagpur City.—Chemicals may be bought of B. K. Paul & Co., 3, Bonfields Lane; Paradise Perfumery House, 75, Colootola Street, D. G. Gore, 31, Mangaldas Road, Fort and Perfumery Raw Materials Co.; Charni Road, Girgaon; first two of Calcutta and last two of Bombay.

2498 G. D. A., Allahabad.—Recipes of insecticides appeared several times in these columns. Your other query is unintelligible.

2499 G. S., Batala.—Process of preparing milk powder appears elsewhere in these columns.

2503 G. I., Darbhanga.—For liquid ink eraser write to Laurel Novelty Co., 46, Park St., Calcutta; Mohamedbhoy Jivabhoy & Co.; Nizam

Street, Bombay No. 9, and Indo German Trading Co., Cocanada. For the Knitting machine required write to the Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta. Carpenter's tools may be bought of N. G. Mitra & Co., 135, Chandney Chowk, Calcutta. Hardware may be had of Abinash Chunder Dutt & Co., Monohar Dass Chowk, Barabazar, Calcutta. Stationery articles may be supplied by Messrs. Dass & Co., 60, Sikdar Bagan Street, Calcutta. Coconut oil and ground nut oil may be bought of Anath Nath De, 3, Moidaputty, Barabazar, Calcutta. Wants to be put in touch with dealers in date *Gurh*.

2504 M. V. J., Madras—Whiting is used in making putty and other substances employed in the arts and consists of chalk ground under water and washed to remove sand, etc. It is a remarkable soft and smooth substance almost wholly free from gritty particles. This may be bought of Hanooman Prasad & Sons, 2-3, Bonfields Lane, Calcutta and B. Parthasarathy Chetty, 2, Vencatachella Mudali Street, Madras.

2509 M. P., Agra.—The Indian Agent of C. A. Richards Ltd., is Kerawalla Bros., Sadar Bazar, Delhi. For sewing thread required enquire Patuck Sons & Co., Bake House Lane, Fort Bombay and the above firm. Mother-of-Pearl buttons of Japan may be had of Volkart Bros., 1, Rainpart Row, Bombay. Other kinds of buttons may be bought of S. A. Khaliq & Co., 11, Colootola Street, Calcutta and Khan & Khan, 10 Meadows Street, Fort, Bombay.

2510 K. C. Bannu.—Yarns may be supplied by Chamanlal Sarabhai Javeri, 311, Shroff Bazar, and Dinshaw & Co., 19, Forbes Street; both of Bombay.

2511 C. R. S., Moga.—"Harra" is chebulic myrobalan; "bahera" beleric myrobalan and "amla" embelic myrobalan. Ritha is known as Indian soap nut, Amaltas is cassia.

2512 A. N. Bombay.—Recipes of toilet cream will be found in July 1924 issue.

2513 D. V. S. A., Guntur.—You need not use glass powder. Sodium silicate of 1.25 specific gravity should be used. Pictures and cartoons are printed on paper from black, the

process of preparing blocks appeared in February 1923 issue.

2515 C. M. A. Madras.—Hydrogen gas generating machines may be supplied by A. R. Khan & Sons, Chanda, C. P.

2517 G. H. M. J., Bassein.—For porcelain vessel enquire of Calcutta Pottery Works Ltd., 45, Tangra Road, Calcutta and Satya Charan Paul & Sons, 194, Old China Bazar Street, Calcutta. For printed tin boxes write to Calcutta Tin Printing Works, Post Box 6772, Calcutta. Addresses of journals mentioned by you are not known.

2519 L. A., Haridwar.—Chemicals you require may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

2520 V. D. B., Lahore.—Macerate mercury and copper sulphate in equal proportion when the product will be a pasty stuff. Mercury is a kind of metal. It differs from all other metals in being always fluid, unless when subject to a degree of cold equal to 39 degrees when it becomes solid.

2521 S. A. C., Ramnad.—Recipe of gold coloured flux appears elsewhere in this issue.

2522 S. B. K., Dehra-Dun.—For books on gardening write to Thacker Spink & Co., 3, Esplanade East, Calcutta.

2523 S. P., Boyaram.—Brass utensils may be bought of Durgaprasad Ramcharan Dasashwamedh and Ambica Stores, 8/22, Banskafatak; both of Benares City.

2525 K. C. K. S. S., Hindupur.—Advertisements of Industrial exhibitions appear in the

local papers from time to time. For perfuming snuffs consult the recipes that appeared in November 1924. For indigo carmine try Oriental Industrial Co., College Street Market, Calcutta.

2526 P. R. S., Madura.—You may consult The Eastern and Indian Engineer Published from Mangoe Lane, Calcutta; Engineering and Industrial Management published by Louis Cassive Co., 34, Bedford Street, Strand, London W. C. 2 and Engineering Industry published by Engineering Industry Ltd., Sardinia House, Kingsway, London W.C.3.

2527 S. M., Chittagong.—If you just go through a book on chemistry you will find the process of generating hydrogen gas therein. Hydrogen gas may be filled with a machine which may be supplied by A. R. Khan, Chanda, C. P.

2528 M. R. B. S., Rawalpindi.—Lotus honey may be had of Dhar Bros, Srinagar, Kashmir and Kashmir & Tibet Trading Co., Srinagar, Kashmir. Musk may be bought of Seth Amer Nath No. 3 Ludhiana. The above firms may also supply you gorachana. There are series of books on advertisement writing which may be supplied by Thacker Spink & Co., 3, Esplanade East, Calcutta. For advertisement writing you may consult the following journals. Advertiser's Weekly, Bangor House, 66/67, Shoe Lane, London E. C. 4; Advertising World, Sardinia House Kingsway, London, W. C. 2; Advertising World, Columbus, Ohio, U. S. A., and Advertising and Selling, New York, U. S. A.

2529 M. S. S., Hospet.—The following recipe will yield a good depilatory powder. Sulphide of sodium (crystallised) 3 parts; quicklime (in fine powder) 10 parts; starch 10 parts mix. To be mixed with water and applied to the skin, and scraped off in 2 or 3 minutes with a wooden knife. Recipe of tooth powder will be found in March 1925 issue of **Industry**. For recipe of eye cure consult a physician. For copying of designs required write to H. C. Kurz A-G, Nurnberg and Hand Pencil Co., Nurnberg; both of Germany.

2530 T. S., Kumbakonam.—An article on preparing electric battery appeared in November 1925 issue.

Kaminia- Oil

Used by all nations for preserving and beautifying the hair and keeping the head cool and brain refreshed.

Rs. 1¼/- per bottle.

(Registered)

TRY IT ONCE.

SOLD EVERYWHERE.

2532 P. O. H., Coimbatore.—An article on ink appeared in November 1922 issue. An article, on rubber stamp making will be found in November 1923 issue. •A good recipe of chemical gold appeared in July 1923 issue of **Industry**. Recipe of depilatory powder appears elsewhere in these columns. Recipe of tooth powder will be found in March 1925 issue of **Industry**. Recipe of pain balm appeared in October 1921 issue of **INDUSTRY**. For hair oil manufacture you may consult booklet, Hair Oil Manufacture published from this office.

2533 N. L. M., Dhaka.—For preservation of syrup you should follow the directions step by step as given in the book. You may try the first principle of bottling while hot into bottles and then to prevent access of air. While packing cover over the morabbas with syrup. A good recipe of aluminium solder will be found in the last issue. For repairing stores enquire of D. R. Wagle, Tram Terminus, Girgaum, Bombay.

2534 E. F., Pathankote.—The spices required by you may be had of Jadu Nath Ghar, Hookapatty, Bara Bazar, Calcutta.

2535 M. R. R., Mysore.—Your name has been entered in our office file.

2536 A. R. V., Bombay.—Process of preparing vegetable margarine, i.e., artificial butter appeared in August 1925 issue.

2537 S. C. R., Shwebo.—Alfa Cream separators may be supplied by Edw. Keventer Ltd., Dairy Farm Aligarh U. P. Ghee may be bought of Durga Charan Rackshit & Sons, Cotton Street, Calcutta.

2539 K. M. A. S., Secunderabad.—Series of articles on canning appeared in April, May and June 1924 issues of **INDUSTRY** which you may consult for preserving fruits. For label printing write to Calcutta Fine Art Cottage, 76, Dharamtala Street, Calcutta. Wants to buy molasses and yeast.

2540 S. N. T., Ghoramara.—Recipes of cakes will be found in February 1925 issue. Pulverize and mix intimately 100 parts of extract of logwood and 1 of bichromate of potash and 1/10 of the weight of the whole of indigo blue. The product will be a good blue black ink. Process

of preparing celluloid from potatoes appeared in July 1922 issue. Recipes of good snuff will be found in November 1924 issue. As regards your last query we cannot advise you.

2541 M. D., Minbu.—Wants a sugar expert experienced in white cane sugar making and capable of handling big machineries. For disposing of books advertise in the pages of newspapers and periodicals.

2542 A. D. T., Katol.—Recipe for removing superfluous hair permanently is not known to us.

2544 A. P. B., Bhagalpur.—Your enquiries being in nature of advertisements should not be published in these columns.

2546 B. K., Mirpurkhas.—Yeast may be supplied by P. C. Coondoo, 28, Municipal Market (East) Calcutta.

2552 C. E., Chaman.—The following are some of the paint works of India. Murarka Paint & Varnish Works, Sodepur, 24 Parganas, Bengal; Gohagan Paint & Varnish Factory, Bombay and Pioneer Indian Paint & Oil Works Co., Ltd., Bombay, Suburban.

2553 D. B., Calcutta.—An article on lozenge making appeared in September 1923 issue. As regards other recipes of lozenges these appeared from time to time in Small Trades and Recipes columns of **INDUSTRY**. For book on lozenges try Thacker Spink & Co., 3, Esplanade East, Calcutta. Capital required for starting a lozenge factory depends mainly upon the range of your business. You may invest from Rs. 2,000 to Rs. 20,000.

2557 K. R. N., Tirumangalam.—An article on tapioca appeared in September 1924 issue. Brass mould may be bought of Dutt Engineering Works, 78, Manicktala Street, Calcutta. Industrial and Trade Review for India has ceased publication.

2560 D. N. R., Chicacole.—Electric batteries may be bought of McLawrie & Co., 17, Ezra Street, Calcutta.

2561 K. G., Suffry.—Captistilla may be bought of S. N. De, Post Box 7851, Calcutta. Bengali equivalent of podophy mumonodi is not known, its Hindi equivalents are 'Papra,' 'papri,' bhavan-bakra and bakra chimyaka. It is a

small, erect, herbaceous plant met with in the higher, rich and shady temperate forests from Sikkim to Simla, Kashmir, Hazara, Tibet, the Kuram Valley and Afghanistan. It has a perennial rhizome, the part above ground being annual. It appears about the middle of April, its reddish succulent stem bearing a pair of curiously reflexed leaves which droop umbrella-like from the top of the petiole. The stem rises to a height of 6 to 12 inches before the leaves are fully extended.

2562 S. M., Rangoon.—You may establish business connection with B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

2563 H. H. R., Lucknow.—Can supply horn and ivory articles of all designs.

2565 U. D. S., Arrah.—Your query is outside the scope of **Industry**.

2566 R. V. V., Rajpura.—Gum arabic may be supplied by Bansidhar Dutt & Son, 120, Khengraputty, Bara Bazar, Calcutta.

2567 K. A., Ajmere.—Hydrogen peroxide is available in liquid form but not in powder or tablet.

2568 D. N. K., Srinagar.—Java sugar may be supplied by A. A. Aziz & Co., 20, Kampong Gipo, Sowrabaya; Mc Neill & Co., Samarang and Osman Yousuf & Co., Boonstraat, Sourabaya; all of Java. Wants to be put in touch with dealers in saffron, embroidery and shawls.

2569 M. L. A., Mandhali.—For industrial and technical books enquire of Chackraverty Chatterjee & Co., Ltd., 15, College Square Calcutta and Commercial books such as books on book-keeping, shorthand typewriting, etc., may be bought of Kamala Book Depot Ltd., 15, College Square, Calcutta. Instruments and apparatuses required for starting perfumery industry write to Scientific Supplies Co., 29-32, College Street Market, Calcutta.

2570 R. S. R., Moga.—Bicycles may be bought of Wellington Cycle and Motor Co., Shibotri Bank Bldg., 52, Tamarind Lane, Bombay; Karachi Cycle and Motor Co., 1743 Elphinstone Street, Karachi and Automobile Co. Ltd., 5/12, New Queen's Road, Bombay. Clocks and watches may be had of Abrecht & Co., 17 and 18, Ezra Street, Calcutta, Hormasji & Co., 225-

227, Hornby Road, Fort Bombay and F. Allidina & Co., Elphinstone Street, Karachi. Toys may be supplied by R. K. Motishaw & Co., 11, Humum Street, Fort Bombay and Sind Juvenile Co-operative Society, 1873, Elphinstone Street, Karachi. Gramophones may be bought of Carr and Mahalanobis, Chowringhee, Calcutta and Gramophone Palace, Harrison Road, Calcutta. Wants to be put in touch with suppliers of luminous German heads, Durham Duplex razors and Practico fountain pens.

2571 R. S. P., Mhow.—For analysis write to Dr. Ghose's Laboratory, Bow Bazar, Calcutta.

2573 C. B. M., Bangalore.—You may consult German Printer published by Dr. Ernst Boeme, Berlin S. W. O. 1, Germany.

2574 R. A. S., Kunta.—Full address of Mr. C. S. Sarkar is 80/A, Narkeldanga North Road, Calcutta.

2575 S. A. C., Shanmugathapuram.—Imitation diamond may be bought of Benode Behari Dutt, 1, Bentinck Street, Calcutta.

2576 R. A. K., Banga.—You may consult Soap Manufacture by Mr. A. Watt to be had of Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

2577 K. S. L., Kumdur.—For oil mills enquire of Burn & Co., Honkong House, Council House Street, Calcutta.

2578 D. D. S., Ghaziabad.—For Hindi types enquire of Gujrati Type Foundry, Gaiwadi, Girgaon, Bombay.

2579 S. H. R., Bangalore.—For facsimile type written circular write to Thacker Spink & Co., 3, Esplanade East, Calcutta.

BOMBAY DESHI OUSHADHALAYA.

Factory & Dispensary.

ASK FOR ANY FEVER.

Ague Killer.

1 Phial As. 8.

Doz. Rs. 5.

and our other popular remedies.

Can be had everywhere at

Cheapest Rate.

**PEARL & CO., Victoria Garden,
BOMBAY.**

2580 P. B. M. B., Madras.—For the machines required try Oriental Machinery Supply Agency Ltd., 20|1, Lall Bazar Street, Calcutta.

2581 V. P. G., Bombay.—It is not possible to neutralise poisonous effects of methylated spirit and deodorise it.

2583 A. K. P., Madras.—Tin box making machines may be supplied by Alfred W. Stoker, Ingram House, 165, Fin Church Street, London, E. C. For industrial books enquire of Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

2584 B. M. M. & Co., Sadhli.—It is very difficult on our part to say which firm in the Bombay Presidency will take second hand machineries, hence it is advisable for you to advertise in the pages of local newspapers and periodicals.

2585 C. V. N. R., Rajahmundry.—Refer your query to the Director of Commercial Intelligence, Council House Street, Calcutta.

2586 N. C. M., Rangoon.—Musical instruments may be supplied by Stagni Armando, Irnerio, 21, Bologna, Racca Gioyanni & Co., V. Milazzo, 16, Gherardi Carlo, Ferrara; Rosati Leopoldo, V. di Riffredi, 3 A, Florence; Contavalli Luigi, Imola; Rameilio Donte, viale Manforte, 21, Milan; Vinaccia Fratelli & Co., V. Orlando 50, Naples; Casa Musicale Italiana S. A., V. Due Macelli 127, Rome and Colombo Federico, C. Valentino 36, Rome; all of Italy.

2587 G. P. P., Jharsaguda.—Recipes of hair dyes appeared in January 1925 issue. An article on peppermint appeared in August 1921 issue.

2591 J. L. Z., Benares City.—For the machines required write to Bhawani Engineering and Trading Co., 122|1, Upper Circular Road, Calcutta; Calcutta Industries Ltd., 136|37, Manicktala Main Road, Calcutta and Oriental Machinery Supply Agency Ltd., 20|1, Lall Bazar Street, Calcutta.

2593 S. N. H., No address.—Woolen goods may be supplied by Adolf Dobel & Co., Brunnenstrasse 181, Berlin No. 54 and David & Co., Niederwallstrasse 13, Berlin; both of Germany. Refer your other query to the Director of Industries of Madras, Madras.

2595 R. A., Agra.—For books on bakery write to Thacker Spink & Co., 3, Esplanade East, Calcutta.

2596 S. M. S., Shahpur.—The book required by you may be bought of Chackraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

2597 S. M. Z., Rawalpindi.—Rubber soles may be had of Bombay Sports Depot, 13 c, Old Court House Street, Calcutta. Small dynamos may be supplied by McLawrie & Co., 17, Ezra Street, Calcutta. Small power engines may be bought of Alfred & Herbert Ltd., 13, British Indian Street, Calcutta.

2598 J. A., Chittagong.—For husking machine of required description write to T. E. Thomson & Co., Esplanade East and Burn & Co., Honkong House, Council House Street; both of Calcutta.

2599 R. R. B., Robertsonpet.—The Oriental Machinery Supply Agency, 20|1, Lall Bazar St., Calcutta may indent the bakery machinery on your behalf.

2601 H. S. A., Kalladaikurichi.—Precious gems and ornaments may be bought of Benud Behary Dutt, 1A, Bentinck Street; B. Sircar & Sons, 13, Bow Bazar Street, and Ghosh & Sons, 16|1, Radha Bazar Street; all of Calcutta.

2602 K. N. S., Sambalpur.—For glass phials of required design write to Calcutta Glass and Silicate Works, Belgatchia and Bengal Glass Works Ltd, Mg. Agents, Fbrahim Mahomed & Co., 39|1, Canning Street; both of Calcutta. For tin boxes enquire of Rampratap Gajanand, Halsi Bagan Road, Calcutta.

2603 M. M. B., Bombay.—Try to sell black salt to local salt dealers. **Industry** is the only journal of its kind in India. The following are some of industrial and technological journals of foreign countries: (1) American Journal of Science, Pub. A. T. Bind, 22, Bedford Street, strand London W. C. 2 (2) Amateur Mechanic, 41, South Castle Street, Liverppol; (3) Chemistry and Industry, 46|47, Finsbury Square, London, E. C. 2; (4) Design and Industry, King Fisher Press Ltd., 27, Southamton Street, London W. C. 2; (5) Brush Making 21 Bride Lane, London E. C. 4; (6) Domestic Engineering; 9, King St.,

Convent Garden, London W. C. 2; (7) People's Home Journal, New York, U. S. A. and (8) Scientific American, New York, U. S. A.

2604 R. T. C., Hyderabad.—Tablet making machine may be supplied by Komprimier Maschinen-Gesellschaft Guerickestrasse 67, Berlin S. 61, Germany.

2605 A. L., Chicacole.—Glass nibs may be supplied by Seitaro Arai, 11 Ichome, Onoecho, Yokohama and Choya & Co. Ltd., 19, Nishigashi, Ninonbashi-ku, Tokyo, both of Japan.

2607 M. D., Pegu.—For second hand coats write to Army Departments.

2608 R. V. S., Bijapur.—Peppermint crystals are not manufactured in India. These are imported from abroad.

2609 C. G. P., Nandyal.—For banian making machine write to Asiatic Knitting Commercial Corporation, Post Box 418, Bombay.

2610 T. H. B., Chipri.—For starting business with small capital please go through the New Idea Columns of **Industry**. You may also supply milk, vegetables and fish from villages to nearest towns.

2613 B. B. P., Simla.—For hair oil manufacture you may go through the booklet Hair Oil Manufacture published from this office.

2615 S. D. A., Trichinopoly.—Industrial books may be supplied by Chackraverty Chatterjee & Co. Ltd., 15 College Sqr., Calcutta.

2616 V. G. P., Bijapur.—Carpets may be bought of Oriental Carpet Manufacturing Co., Amritsar and Woollen Carpet Factory, Datia, C. I. Desires to buy panther skin and petromax lights.

2617 S. B. J., Pendra Road.—Soap stamping moulds may be bought of Calcutta Industries Ltd, 136-37 Maniktala Main Road, and Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar

St, both of Calcutta. Coconut oil may be supplied by Panchkari Tat, 5 Mir Bahar Ghat Street and Anath Nath De, 4 Moidaputty; both of Bara Bazar, Calcutta. Soap nut may be had of Banshidhar Dutt & Sons, 126 Khengraputty, Bara Bazar, Calcutta. For industrial books try Thacker Spink & Co., 3 Esplanade East, Calcutta. You need not take any licence for stocking in small quantity methylated and rectified spirit for manufacturing purposes.

2618 G. M. G., Poona City.—Jeweller's tools may be supplied by L. Basack & Co., 5, Old Court House Corner, Calcutta. For the books required try Thacker Spink & Co., 3, Esplanade East, Calcutta.

2619 R. M. S., Benares.—For toy pistol try Eastern Trading Corporation, P-14, Central Avenue and Sheik Nazir Ali, 5, New Market; both of Calcutta.

2620 A. R. T., Calcutta.—Reply to your queries appeared in November issue in the Brief Queries and Replies column under No. 1871.

2621 A. S., Najibabad.—There is no regular market for honey. By proper advertisement and publicity you will have to increase sales of honey. Pure honey is pale and fragrant. Pure honey when boiled with water for five minutes and allowed to cool, should not become blue with iodine water. There is no book solely dealing with honey. For rapid sale of honey you may advertise in pages of newspapers and periodicals. For conducting business efficiently you may go through the pages of **Commercial India**, the sister journal of **Industry**. For doing mail order business you may consult **Mail Order and Mercantile Letters and Methods** by K. M. Banerjee to be had of Industry Book Dept.

2622 R. U., Muzaffarnagar.—Refer. your query regarding papaw cultivation to the Director of Agriculture of your province. Good recipes of hair dyes with indigenous drugs, and herbs appeared in January 1925 issue of **Industry**.

2624 U. P. V., Godavary.—For looms enquire of Bros Partner & Co., 35, Ezra Street and B. D. Bery & Co., 43, Ripon Street; both of Calcutta.

WHERE?

To get Fresh and Genuine Homoeopathic and Bio-Chemic medicines at 5 & 6 pice per drum? It is **Homoeopathy Bistar Samity, Patuatuly, Dacca**, who indent medicines direct from America & Germany. Provident Fund allowed to Regular customers. Ask for prospectus to Director **J. Mukherjee, B.A.**, Late Asst. Headmaster Hemnagar and Muktagachha High Schools.

WHERE??

2626 P. S., Bombay.—Process of printing photographs on silk appeared in June 1923 issue. Process of preparing milk powder appeared in September 1923 issue of **Industry**.

2627 A. B. S., Ghoramara.—Process of extracting lemon oil appeared in June 1922 issue. For keeping sweetmeats fresh for some days you may put them in syrup. Ice making plant may be had of Burn & Co., Honkong House, Council House Street, Calcutta. For exporting Indian sweetmeats to England write to High Commissioner for India, Grosvenor Garden, London.

2628 C. J. J., Travancore.—Method of purifying castor oil appeared in January 1924 issue.

2629 M. K., Wynaad.—Capital to be invested in mail order business depends mainly upon the scope of the business. In the beginning you may lay out Rs. 500.

2630 M. S. B., Shinoga.—Process of gilding will be found in April 1923 issue. For cinema films write to Pathe Cinema Ltd., Pathe Bldg., Ballard Estate, Bombay. Rolled gold ornaments may be bought of Mohamed Emanulla & Co., 8, Kalutola Street, and S. A. Khalique & Co., 11, Kalutola Street; both of Calcutta.

2631 P. S. R., Kudligi.—Ferro-prussiate papers may be bought of Bengal Miscellany Ltd., 99, Manicktola Main Road, Calcutta.

2632 D. R. M. R. C., Jullundur City.—Candle making apparatuses may be supplied by Calcutta Industries Ltd., 136-37 Manicktala Main Road and Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street; both of Calcutta. The latter firm may also indent the pencil making machine on your behalf.

2633 A. E. O., Rangoon.—Carbon pencils may be bought of McLawrie & Co., 17, Ezra Street, Calcutta.

2634 R. S. M. P., Benares City.—Candles are manufactured by Electric Soap and Candle Works, Napier Street, Karachi; Hind Candle Works, Sandhurst Road, Girgaon, Bombay and M. S. Krishna Murthi Rao, Rose Hall, Mysore. Reply to your other queries appears under No. 2492.

2636 J. R., Ghoramara.—Recipes of essences will be found in September 1924 issue.

2637 R. D. J., Almora.—Papers of all sorts may be bought of Ghose Bros., 63/J, Radha Bazar Street, Calcutta.

2638 S. D. R., Chittoor.—Process of extracting essences direct from flowers will appear in an early issue of **Industry**.

2639 R. G., Nowgong.—Waste bulb cannot be repaired.

2641 K. A. H., Adoni.—Glass bangles are manufactured by H. S. Aktar Hossain Ansari, Mohaulla Kotta, Firozabad, Agra. These are imported by F. P. Nalladaroo & Co., 50/1, Canning Street, Calcutta. Glass bangles may be supplied by S. Komai Glass Manufacturing Co., 4, Chome, Minami Honmachi Higashi-ku, Osaka and Nishiumi Sakujiro Shoten, 49, Shichome, Minami-kyahoj-i-machi, Osaka; both of Japan.

2645 D. N. B., Andulberia.—List of foreign periodicals appears elsewhere in these columns.

2646 N. S., Palamcottah.—For the address required write to the Editorial Department of Industrial and Trade Review for Asia, 104, Reichsstrasse, Berlin-Charlottenburg, Germany.

2648 M. F. M., Delhi.—You may start agency business which will not require large capital; you may supply milk, vegetable and fish to the markets of town from the neighbouring villages. For other ideas you may go through New Idea Columns of **Industry**.

2650 G. S. B., Madura.—For magical appliances and books write to Hamley Bros, Ltd., Magical Palace, 35, New Oxford, Street, London W. C.; J. S. Oglivie Publishing Co., 57, Rose Street, New York, U. S. A. and Wile Gladstone Ltd, 14, Green Street, Leicester Square, London, W. C. Printing machines may be supplied by Derriey Jules, a v Ph August 79-85, Paris and Winkler Fallert & Co., rue de la Pepiniere 2, Paris; both of France. A good glass cement may be made by making a paste of casein and water glass and adding a little quantity of rectified spirit. Wants a partner with a large capital to start a magical business.

2651 H. S. C., Nagpur.—Due to cheap price of imported sugar it will not be profitable to start new sugar industries. Again the financial condition of already existing ones are not good.

as their product is not speedily sold in the market. As regards coconut oil industry you may start it with at least Rs. 10,000. Machineries required may be supplied by Burn & Co., Hopkong House, Council House Street, and Jessop & Co., 93, Clive Street; both of Calcutta. The above firms will also supply you with estimates and other allied information. For dried coconut kernel enquire of Jadavji Keshavji & Co., Mattanchery, Cochin; Kirk Patrick & Co., Cochin and Nensi Devasi Kathawala & Co., Cochin.

2652 B. B. H. B., Morar.—For preparing good sealing wax take venetian turpentine 133 parts; shellac 233; cinnabar 83 and chalk mixed with oil of turpentine 3 parts. Boil and when of required consistency remove from fire and pour in the mould. Recipes of various kinds of catechu appear elsewhere in this issue. Wants to be put in touch with consumer of thymene.

2654 M. P. S., Salem.—Ayurvedic books may be bought of N. N. Sen & Co. Ltd., 18/1, and 19, Lower Chitpur Road, Calcutta.

2655 H. P. P., Palitana.—Mercuric oxide may be prepared by adding sodium hydrate to a solution of mercuric chloride, when the oxide is precipitated as a yellow powder having the same composition as the red form. Process of preparing mirrors appeared in December 1925 issue of **Industry**.

2656 P. G. C., Papanasam.—Recipes of match composition appeared in September 1923 issue of **Industry**.

2657 K. C. K. S., Hindupur.—Reply to your queries appears under No. 2525 in this issue.

2660 M. M. C., Quetta.—An article on vaseline appeared in December 1921 issue of **Industry**. An article on boot polish manufacture will be found in June 1923 issue. Success in business depends mainly upon business efficiency and organisation.

2661 P. C. S., Jhang.—Toys may be supplied by Chichgar's Toy Works, Karachi; Eastern Trading Corporation, P-14, Central Avenue, Calcutta; Sheik Nazir Ali, 5, New Market, Calcutta; Stollz & Thumler G. m. b. H., Ziegenruck, Thuringen; Friedrich Schmeltz, Nurnberg; J. Hasselbacher & Co., Nurnberg;

last three of Germany. Germany or Japan is the best place for training in toy industry.

2662 I. C. C., Bombay.—Is desirous of buying old metal and old iron and steel scraps.

2663 M. A. R., Kymore.—Crown corks may be supplied by N. W. Mitchell & Sons Ltd, 2, Dod Street, Lime House, London E. 14.

2664 D. V. P., Kurnool.—Assafoetida may be bought of S. S. Batheja Co., Peshawar City. For trade mark registration correspond with our advertiser Messrs. P. Lodge & Co., Post Box 6772, Calcutta. 'Wants 'pygopa' lac of Rangoon.

2665 R. P. K., Lahore.—Recipes of hair curling lotion will be found in September 1924 issue. Recipes of face cream appeared in July 1924 issue. For 'false moustache and beared enquire of Kunja Lal Pal, 318, Upper Chitpur Road, Calcutta.

2667 B. B. C., Salup.—You perhaps mean cinema film and cinema machines. These may be supplied by J. F. Madan & Co., Ltd., 5, Dharamtala Street, Calcutta.

2668 D. R. P., Tiruthurapundi.—For glazing powder write to Calcutta Pottery Works Ltd., 45, Tangra Road and Sorab Dalal Tile Works, Kathiawar.

2670 A. S., Najibabad.—You may go through Dairy Farming in India by D. J. Megher & R. E. Vanghan to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta. Other queries have already been replied.

2671 G. P. M., Bara Banki.—For fancy goods required enquire of our advertisers K. G. Maniar, 55/1, Canning Street, Calcutta; The Union Trading Co., 166 Harrison Road, Calcutta and Ram Bros, 883/45, Burns Road, Karachi.

2673 A. S. S., Cuttack.—Recipes of Indian sweetmeats such as 'rasagollas,' 'sandesh,' etc., will be found in Bengal Sweets by Mrs. J. Haldar, to be had of Chackraverty Chatterjee & Co. Ltd., 15, College Sqr., Calcutta.

2674 K. P. B., Lucknow.—Chemicals may be supplied by Oriental Industrial Co., College Street Market and Calcutta Chemical Co., 35/1, Panditia Road, Ballygunge; both of Calcutta. Scientific apparatuses may be bought of Scientific Supplies Co., 29, College Street Market,

Calcutta and Scientific Instrument Co. Ltd., Johnstonganj, Allahabad.

2675 G. S., Kotah.—Reply to your queries has been sent by post.

2682 H. M. B. K., Farrukhabad.—Tablet making machines may be bought of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

2683 N. K. M., Elempulasseri.—For platina and plaster of Paris enquire of Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta. Process of gilding appeared in April and June 1923 issues of **Industry**. There is nothing known as imitation whisky.

2684 N. V. R., Allipore.—Wants to be put in touch with agents of Blick typewriters.

2685 S. K. A., Lashkar.—For selling used stamps you may correspond with T. S. Naidu, Ambasamudram, S. India and V. R. Sundararaja Sarma & Co., Palavangadi, Fort Trivandrum, Chalai.

2686 J. I. W., Tirthahalli.—Process of preparing sand paper appeared in May 1922 issue. For carpenter's tools enquire of N. G. Mitra & Co., Chandney Chowk, Calcutta. Small industrial machines may be supplied by Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street and Bengal Small Industries Co, 91, Durga Charan Mitter Street; both of Calcutta. Lathes may be supplied by Alfred Herbert Ltd., 13, British Indian Street, Calcutta.

2687 T. M. V. R., Tirthahalli.—Yarns may be bought of M. A. Ahmed Batcha Sahib & Co., Badshah Bldg., Old Municipal Office, 22, Erabalu Chetty Street, Madras, M. Ghelabhai & Co.,

Reid Road, Ahmedabad; Gokaldas Maganlal & Co., 208, Ekambareswara Agraharam, P. T. Madras nad Motilal Vallaliji & Co., 4, Bruce Lane, Bombay. For dyeing yarn you may go through last August and September issues of **Industry**.

2688 H. V. R., Penukonda.—Fountain pens may be bought of F. N. Gupta & Co., 13, Belliaghata Road, Calcutta. Watches are imported by Abrech & Co., 17 & 18, Radha Bazar Street, Calcutta; S. L. Basack, 5, Old Court House Corner, Calcutta; Bombay Jewellery Mart, 367, Hornby Road, Bombay and Hormasji & Co., 225-227, Hornby Road, Fort Bombay. Optical goods may be supplied by Stephens & Co. Ltd., 215, Bow Bazar Street, Calcutta; Lawrence & Mayo Ltd., 16, Old Court House Street, Calcutta; B. Griffith & Co., Lamington Road, Post Box 7, Bombay and S. A. Husen & Co., 318-320, Abdul Rehman Street, Bombay.

2689 Y. V. N., Kathapet.—Wants to be put in touch with dealers in turmeric fingers.

2690 R. S. R. K., Guntur.—Blue clay may be bought of Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta. Spirit of wine may be had of D. Waldie & Co., 1, British Indian St., Calcutta. You may use aniline dyes too. For refilling dry batteries please consult the last issue.

2691 V. A. M. P., Negapatam.—An article on biscuit making appeared in February 1925 November issue.

2692 A. B., Nizamabad.—Photographic plates and sensitive paper are not manufactured in

THE UNEMPLOYMENT NUMBER.

We regret that as soon as the December Special Unemployment number was out, the extra copies for cash sale being sold off, we could not supply copies to those who are still sending stamps. The Agents who are still asking for extra copies for cash sale are requested to note that these are not available.

Our next Special number will be the April issue. We wish our patrons and agents will intimate early and register their orders in time so that there will be no disappointment in future.

The cost of production is so heavy that a second reprint edition is not possible.

NOTICES AND REVIEWS.

A Religious Tract.

Pharmacopœa of Life.—By Mr. Harimohan Banerji, President, Arya Mission Institution, Calcutta. Pp. 252, Price Rs. 1-8. To be had of 511, Kasi Bose Lane, Calcutta.

We have had already occasion to refer to the philosophical works of Mr. Harimohan Banerji who is known throughout the country and abroad for his saintly character. It is with a philanthropic motive that he writes these sublime tracts for the spiritual welfare of mankind steeped in gross materialism. The book under review is a rare gem containing as it does diagnosis of and prescriptions for the common ailments of life—both physical and mental.

Book on Hydropathy.

Chheleder Jalchikitsa or Hydropathy for Children in Bengali. By Babu Nirmal Chandra Chatterjee, B.L., Published by Messrs. N. C. Bros. & Co., 201, Kaliprosad Chakrabarty St., Baghbazar, Calcutta. Pp. 64, Price 8 as.

Though the book is primarily a work on hydropathy several chapters have been devoted to subjects of general interest such as hygiene, sanitation, first-aid, causes and prevention of diseases, and the like. A sound knowledge on these matters concerning physical health cannot but prove beneficial to the reader. The author has explained in simple Bengali the new cult of hydropathy with an eye to the welfare of children. The book can therefore be safely prescribed as a text book in primary schools.

Fancy Scale.

A neat celluloid foot measure is an Austrian novelty imported along with other goods from a needle to an automobile by the Fancy Jewellery Co., Shunthuganathapuram P. O., Ramnad Dist., S. India.

Handkerchief Perfumes.

Lavender and Eau-de-Cologne are being prepared under personal supervision by Messrs. Nobles & Co., Sangli, S. M. C. They have given us entire satisfaction the perfume lasting for many days.

Tobacco Products.

Zarda of superior quality and pleasingly scented have been prepared by Babu Durga Das Banerjee, P. O. Samastipur, Dt. Darbhanga, according to the recipes published in these pages.

Tooth Powder.

Tooth powder of good quality is made by Messrs. M. Akbar Bros., Kucha Qasdan, Amritsar.

Substitute for Tea & Coffee.

Avarambo powder is claimed to be a substitute for tea and coffee and prepared according to Ayurvedic pharmacopœa by Mr. V. A. Ramaswamy Iyer, Venkatan Kurichi, Paramakudi, (S. I. R.).

Efficient Pumps.

The Kirloskar Pumps comprise many useful types—hand or power—for lifting water from wells or tanks. They are purely Swadeshi products and have stood the test of time. The sole agents are Messrs. K. B. Joshi & Co., 32, Hornby Road, Fort Bombay.

Printed Tin.

Attractive sign plates and printed tin boxes are two of the useful products nicely executed by The Calcutta Tin Printing Works. The firm also prints on wood and other metals and are specialists in calendar printing and the like. The printing can be done in single colour or

many colours. For rates and quotations our readers should apply to the Managing Agents Messrs. P. Lodge & Co., Post Box No. 6772, Calcutta.

Toilet Products.

The list of toilet products of the Medical and Surgical Hall, Saugor C. P., comprises Eau-de-Cologne, Lavender Water, Hair preparations, Dentifrices and the like. Judging from the samples the articles appear to be made from choice ingredients and as such will satisfy even fastidious taste.

A Fruit Preserve.

Mango pulp is one of the food preserves offered by the Central Canning Co., 459, Narayanpeth, Poona City. The stuff has been canned in the most up-to-date manner and without the help of any preservative whatsoever. It is pleasing to note that the product has preserved the flavour and taste of the fresh fruit.

New Year Greetings.

To all who have sent us new year greetings we reciprocate our heartiest congratulations and wish them an abundance of success and prosperity in their activities. Particularly do we extend our cordiality to The Maharashtra Sports Equipment and Repairs Bureau, Kripal Hemraj Bldg., Gamdevi, Bombay. We also wish good luck to Messrs. S. N. R. C. Rao & Co., Cocanada and bright happiness to The Students' Co-operative Stores, Agra, U. P.

Government Technical Report.

Report on the Investigations on Sole Leather Tannage. Bulletin No. 22 of Government of Bengal, Department of Industries. To be had of Bengal Secretariat, Book Depot at Rs. 1 As. 4 only.

Certain investigations have been carried out by The Calcutta Research Tannery with a view to work out a suitable process on modern lines to make sole leather of good quality from the locally available raw materials. The results have been embodied in the Report under review and promise success for the tannage of sole leather which is an enterprise to be recommended.

Calendars and Almanacs.

We are indebted to Messrs. Ghose Bros., Paper Merchants, 63-J, Radha Bazar Street, Calcutta in respect of two serviceable wall calendars.

Our sincere thanks are due to the Oriental Warehouse, Managing Agents for Oriental Soap Works, Aiyenkadai Street, Tanjore who have presented us with a wall calendar having the picture of a beautiful Red Indian Girl.

We acknowledge with pleasure the receipt of a large wall calendar from the Jubilee Trading Co., High Road, Triplicane, Madras, Importers of Printing machines, fancy jewelleryes, toys, stationeries, etc.

Our hearty appreciation of the compliment of the Deccan Printing Works, 609, Sadashiv Peth, Poona City in the form of a finely printed wall-calendar. The firm undertakes lithography and makes process blocks.

Messrs. Ghasi Ram & Sons, Tea Traders and Commission Agents, Near Police Station No. 1, Delhi have very kindly favoured us with a multicoloured pictorial calendar.

We have received with thanks from Messrs. H. Rama Rao & Sons, Car Street, Mangalore, S. K. a wall calendar with big bold types.

Charming and picturesque is the almanac received with the compliments of The Bengal Nagpur Railway Magazine, Garden Reach, Calcutta.

Messrs. D. G. Gore, Importers of Essential Oils, perfumes, etc., for soap and perfumery trade, 31, Mangaldas Road, Bombay No. 2 have obliged us by sending their nice date card.

A calendar has been received from Messrs. Arava Ramaswamy Sons, General Merchant, Rajahmundry.

We are in receipt of a card calendar from The Modern Art Press, 21, Hyat Khan Lane, Calcutta and another from the Muir Mills Co. Ltd., Cawnpore.

We have received a useful calendar from The West Coast Watch Co., Ottapalam, S. Malabar importers of all kinds of watches clocks, spectacles, lamps, etc.

Trade Enquiries.

[To communicate with any party, write him direct with name and address as given below, mentioning **Industry**.]

2403 Kripa Shankar Dikshit, Lalpura, Etawah.—Can supply pure ghee at cheap rate.

2640 S. M. F. Rahman Shah & Co., Residency P. W. D. Imperial, Indore.—Desire to be put in touch with dealers in heeng and vinegar.

2644 R. D. Banerjee, Raigram, Bankura.—Wishes to be introduced to silk, blanket and sticklac dealers.

2649 Krishna Lall, Paddo Kokher Fast, Asansol.—Wants a capitalist to invest in a very profitable business.

2666 Mahomed G. Mansuri, Khodi Anli, Ahmedabad.—Can supply glue in large quantity

2716 L. Bose & Co., 2 Chatterjee Lane, Calcutta.—Desire to be put in touch with dealers in lizard and squirrel skin

2726 Dr. Bhagwant Sahai Loomba, Sangrur, Jhind State.—Wants addresses of firms dealing in English moulds of rings.

2731 C. C. Shah, Dadbha Street, Wadhwan City, Kathiawar.—Wants a capitalist to invest moderate or large sums of money in a highly profitable mineral industry.

2774 Moosa Ismail Mall, 6 Zegyaung Road, Basscin.—Can supply Pinkado and Thauk-char railway sleepers.

2894 The Venus Assurance Bank Ltd, Delhi.—Can supply bark of a tree used in tanning leather.

2822 The All-India Astrological Home, Andulberia, Dt. Nadia.—Want to buy tobacco leaves and all sorts of tobacco.

2871 G. D. Agarwala, 467 Muthiganj, Allahabad.—Is desirous of buying Japanese hanging Chick and lion's and bear's skins.

2881 Williamson & Co., Daltonganj, Palamau.—Can lease large forest of bamboo, sabai grass and general forest produce.

2883 M. B. Hussain, Mangalgarh, Darbhanga.—Wishes to invest Rs. 2000 in a profitable business.

2903 Dr. Hem Raj, City Old Kotwali, Lahore.—Wants a capitalist with Rs. 4000 to invest in a profitable business.

2913 M. L. Saksena, Nasirabad, Rajputana.—Wants regular supply of 'ak' cotton, second-hand gunnies, goat hair, gum and 'banslochan.'

2923 Imperial Co. of Commerce, Post Box No. 702, Bombay.—Desire to be put in touch with supplier of old metals and old iron and steel scraps.

2957 M. L. Saksena, Nasirabad, Rajputana.—Requires hoofs, horn and feathers, neem seed, and dhatura.

2963 Nand Lall Meer, Chamba.—Wishes to be put in touch with suppliers of fish powder.

2989 Ambe Bur Singh, Hanumannagar, Kanari Bazar, Bhagalporc.—Wants supply of Billaur stone.

3003 Premeukh Goverdhanlal Bathi Nasirabad, Rajputana.—Desire to be introduced to suppliers of mica waste and mica powder.

3022 Probodh Chandra Mukherjee, Jagadral, Sonarpur, 24 Parganas.—Can supply pure ghee in large quantities.

FEBRUARY ISSUE OF INDUSTRY.

(In The Press.)

The February issue of Industry will contain an illustrated article on The Pig Industry, besides containing formulas, recipes, brief queries and replies. Any friend of our subscriber may have a copy free on application to the Manager, **Industry, Calcutta**.

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At the time of sending a V. P. P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V. P. P. For particulars and Advt. rate please write to—

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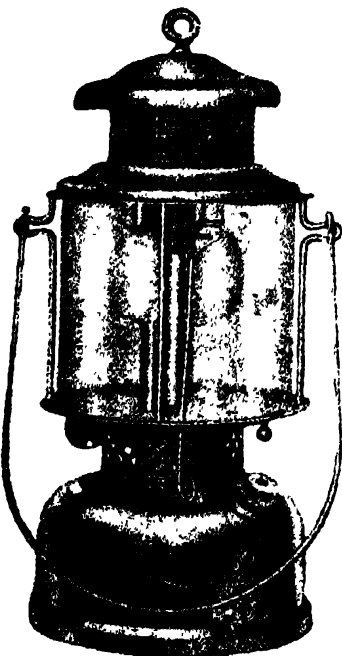
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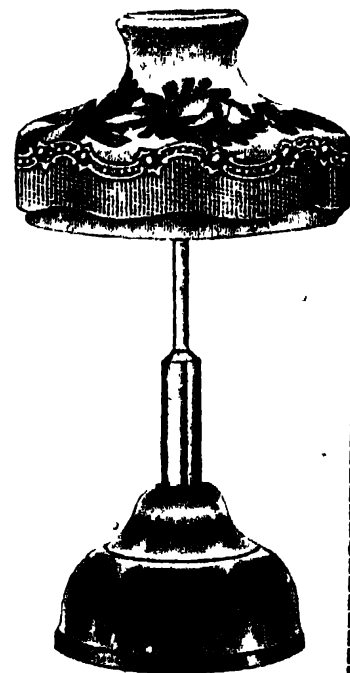


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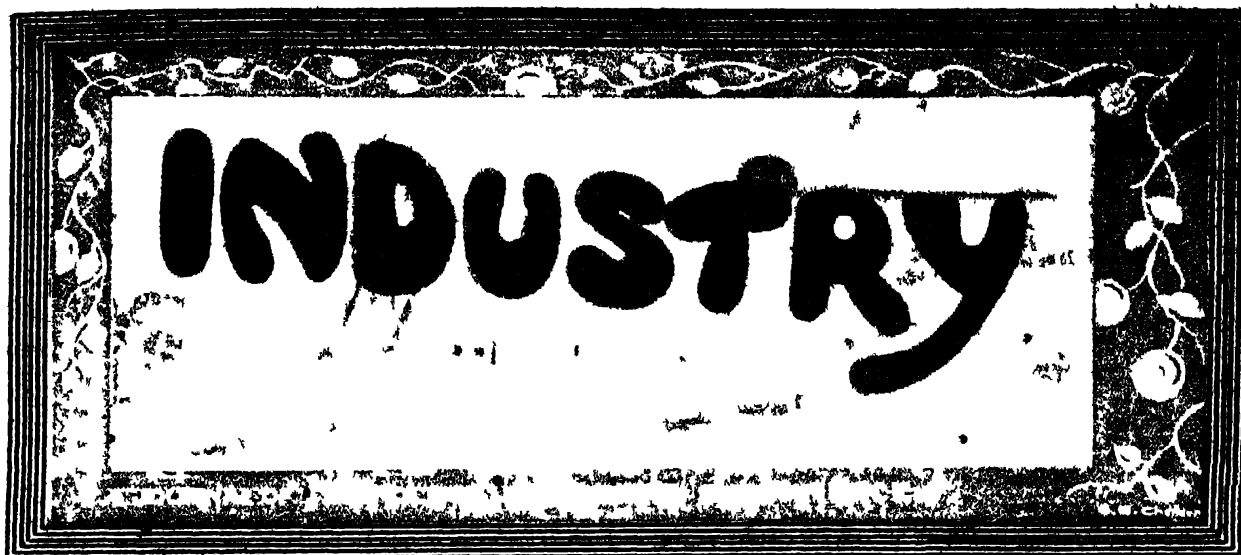
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'PASSING THE SIXTEENTH YEAR.

INDUSTRY is near about passing the sixteenth year and with the April next it will commence the seventeenth year.

As has been announced elsewhere this April first number of Vol. XVII will be the first Co-operation Special number of the year.

We wish it duly in the hands of each of our 20,000 subscribers—nay, in the hands of a few thousand more of our prospective readers.

We wish our old readers to recommend their friends to subscribe to INDUSTRY for their own interest.

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Industry

A JOURNAL OF TECHNOLOGY, HANDICRAFTS & COMMERCE.

VOL. XVI.

CALCUTTA, FEBRUARY, 1926.

No. 191.

CO-OPERATION IN EDUCATION.

THAT story of perennial interest and utility which Æsop unfolded centuries ago, in which the limbs conspired against the belly to teach it a lesson in non-co-operation, has an application in the organisation of modern society in India. The limbs refused to feed the belly and this refusal resulted in the weakness not only of the belly but also of every other limb. But ultimately they had the good sense to stop the non-co-operation in time to save themselves and the belly from destruction.

The Hindus of yore had a system of mass education which in spite of the fact that the literate education was confined among the higher grades of society, the lower grade which consisted of the men and women of the mass had immense opportunity to be versed in the thoughts and teachings of the philosophers.

This system prevailed even during the days of destruction of the later Muhamedan period of Indian History. As a result even now we find every

grade of our society is versed to some extent in the philosophies of the *Rishis* of old. They have kept up the learning through many vicissitudes of life without any literary accomplishments.

Since the early days of the English literary training in vernacular and foreign languages is prevailing in all sorts of our education and although we spend the best part of our early days among the heaps of books that our Universities and other educational authorities prescribe, our boys, when they come out of matriculation examination, know nothing of modern science and modern improvements that are pushing the modern world onward, neither they receive any grounding in the practical arts and crafts of their forefathers or the developments thereon. After matriculation they find themselves grounded on literature only which made them suitable for nothing but clerking their life. They lost what their fathers had, they gain nothing that can help them to lead better life. When the portals of the university is entered their literary study is developed not only

in language but also in physical science, even in mathematics, not to speak of economics and philosophy. Our post-graduate studies produce superb literature in physics, in chemistry, in mathematics, in astronomy, in economics, in philosophy and what not, without any knowledge of application of the immense literary study to the material development of the country and the people.

But let us leave the university education for the present. The mass education of the largest number of people now concerns us more and we must call upon the intelligence that our universities have already produced to devise a system of education, not too literary, but to develop the brains even in the children, that can co-operate with the hand, can guide and work with the labour to produce food for the country, wealth for the mass. Our literate education for the last century has made our brain non-co-operating with the hand. The education of this century should be such as to throw the brain and hand working in the same channel, for the same cause—production of food for the starved mouths and creation of wealth of the mass.

The writer had the pleasure to visit a workman's primary night school the other day started by the Workman's Institute of Calcutta. This is a free school conducted by some of the professors and students of several colleges in Calcutta. About 50 students joined the School comprising five classes. Over half the number of students are workmen themselves and the other half are generally their dependants or associates seeking opportunity for entering in any works. Of the working students 40 p.c. during day time work in Printing Presses. They require some literary work to start with. The others cover a variety of industries that give them occupation, such as goldsmith, tinsmith, brassfounder, wicker-workman, carpen-

ter, grocer, electric worker, tailor, cloth dealer, etc. The percentage of these are very small but in their present occupation they require very little of literary knowledge, which this school is imparting.

Let us take the case of this school, as typical of our primary schools and let us see what education should be most fruitful for the student's occupation in life.

We invite the intelligent men of the universities to devise means and systems of education of the mass in a line that would develop the working capacity inherent to them for developing their fathers' occupations, create in them a desire for such knowledge as would help them in after life and ground them when they are out of their schools in suitable modern development of science. Gaining of knowledge is the main thing necessary in all curriculum of studies of our boys, not an attainment of literary accomplishment.

We want some of our good students trained in teaching in these practical lines—not heaps of books that the boys have scarce opportunity to go into. Here the country demands co-operation from our universities—not costly buildings for our primary and secondary education, neither costly efficiency of the educational inspectors which the country can ill afford to pay.

Let arrangements be made for imparting material education of value to the grown up men of the mass by means of lantern lectures in modern developments in their occupations. Let similar and regular treatment of boys' and girls' education be made, the aim should always be of making their life worthy of the race and worthy of the country. Literary study has a value of its own which should be properly appraised and properly administered, not broadcasted with unsurmountable limitations as we are doing now.

THE PIG INDUSTRY.

India suffers under many disadvantages with regard to the pig industry. She could not only be self-contained but could supply even foreign markets were it not for the apathy of the majority of the people. In this article those disadvantages are analysed and suggestions are made.

INTRODUCTION.

PIGGERY is a neglected subject in India, yet we can assure our readers and especially the small capitalists that it is one of the many interesting and profitable trades, one can very easily undertake in this country. The word pig needs no definition and there is none who has not seen the animal, habituated to the different climates of India. Studying the situation as it stands now pigs are reared by the low-class people in unhealthy quarters, housing them in small dark rooms not more than 3 ft. cube with a small opening through which a bulky creature enters with some difficulty. These are merely reared by those castes who feed on their flesh and the other non-vegetarians think it a sin to partake of pork or bacon.

The secret of success in the pig-industry is co-operation to proceed without which is to build on sand. Chief among the purveyors of pork, bacon and ham to the world is Denmark. Forty years ago Denmark was wretchedly poor, but to-day the Danes and Australians control the world's provision market. Once there was a talk that the Danish breeds of pigs were unsuitable for the production of pork and bacon as is the usual talk with the Indian breeds now. At present the Indian pig industry

is carried on within a certain set of conditions which reduce it to a mere gamble. In nine cases out of ten pigs are bred from stock unfit for progeny. Not one in a hundred pig-keepers has any accurate knowledge of the nature of the different foods he gives to his pigs and their ability to form flesh. Under such conditions it is no wonder to hear that "pig-keeping doesn't pay."

THE BREEDS.

Describing briefly the main breeds, our country has two varieties of pigs, one belonging to the country commonly reared (*woorapandi-Tel*) and the other wild boars (*adavipandi-Tel*) living in forests. The latter is a strong and fierce animal with a horn in the front of the aged ones; the rajahs and all lovers of sport take a delight in hunting wild boars. Pigs are generally black and also white. A good pig cannot have a bad colour, is an old saying which may be taken for what it is worth.

Further division gives us the Large Black, the Large White, Middle Whites and Blacks and Cross Breeds.

LARGE BLACKS head the list and we recommend beginners in the pig business to give this breed a trial in all warm districts, i.e., except in districts exceptionally exposed to damp and cold. The large Blacks are much liked for their



Fig. 1. Mother with her youngsters.

docility, their good reputation as foragers, the quickness with which they put on flesh and the prolific nature of the females of the breed. When grown to heavy weights the pork is inclined to be a little coarse but when killed at a time when the dead carcass will weigh from 90 to 100 lbs. the meat has a good proportion of lean and is of tip-top quality.

All best large Blacks will have the following features:—

Head—Medium length, wide between the ears.

Ears—Long, thin and inclined well over the face.

Jowl—Medium size.

Neck—Fairly long and muscular.

Chest—Wide and deep.

Shoulders—Oblique, with narrow plate.

Back—Long and level, but may rise a little in the centre.

Sides—Very deep.

Ribs—Well sprung.

Loin—Broad.

Quarters—Long, wide and not drooping.

Hams—Large, and well-filled to the hocks.

Tail—Set high, but not coarse.

Legs—Short and straight.

Belly and Flank—Thick and well filled.

Skin—Fine and soft.

Hair—Moderate in quantity, straight and silky.

THE LARGE WHITE is specially suitable for those who make a business of breeding pigs for sale. The youngsters six or eight weeks old, are comparatively big pigs and hence sell readily. These are capital for making first crosses with other pure breeds and the result of such union is the production of baconers of the finest quality.

The points of the large White are:—

Colour.—White, free from black hair and blue spots on the skin.

Head.—Moderately long; face, slightly dished; snout, broad; jowl, not too heavy, wide between the ears.

Ears.—Long, thin, inclined slightly forward and fringed with fine hair.

Neck.—Long and full to the shoulders.

Chest.—Wide and deep.

Shoulders.—Level, and not too wide.

Legs.—Straight and well set and level with the outside of the body.

Back.—Long, level and wide.

Loin.—Broad.

Tail.—Set high, stout and long, with a tassel on fine hair.

Sides.—Deep.

Ribs.—Well sprung.

Flank.—Thick and well let down.

Quarters.—Long and wide.

Hams.—Broad, full and deep to the hooks.

Skin.—Not too thick and free from wrinkles.

Hair.—Long and moderately fine.

MIDDLE WHITES AND BLACKS are suited to all the classes whether it be the large owner with two or three hundred pigs, or the small owner with accommodation for a couple. These are in great favour in South India and in the adjacent countries as well. They grow fast and put on flesh rapidly when well fed. Large-sized pigs show rather too much fat in proportion to the lean, but against this may be set the thinner rind and lighter bone that these animals carry. The main point to be seen is the colour, it should be either entirely pure black or white and free from spots and other coloured hairs.

There are several other distinct breeds of pigs the Small White, the Small Black, and the Deccan Variety; but these have not come much into public favour beyond districts to which they belong.

So from a commercial point of view we think they are worth little consideration.

CROSS BREEDS. A small pig-keeper can give preference to animals springing from a union between two varieties, i.e., first cross pigs. As a general type the Large White sow, crossed with a Middle White Boar, is best for a 15 to 20 stone pig (stone-14 lbs.); a Deccan and a Middle White for a 5 to 10 stone porker. It should be made quite clear that the cross must be only a first cross between two pure-bred pigs, one should never, in any circumstance, be persuaded to adopt a second cross.

SELECTION OF STOCK.

One of the greatest difficulties of the pig-keepers, consists in selecting his stock, but we shall try to make it as simple as far as possible. As a first thing all the points said in the preceding heading should be carefully noted and



Fig. 11. Black and White Pigs.

understood by referring to the illustrations.

The second thing is to consider the type of pig it is intended to keep. For really the pigs to be kept depend upon local requirements or the requirements of the market proposed to send the pigs to. In the South a jointer pig which would produce about 50 lbs. of pork is in general demand; further north in the Western districts we find most in demand pigs weighing from 100 to 120 lbs. Towards the East the pig which sells most readily is one weighing from 200 to 220 lbs. a long, deep-sided pig with good hands. This variety is also exported to Rangoon and further East. It depends therefore very much upon the district a person is living in as to what is meant by the most profitable pig to keep.

The following points given by the Provision Preserving Institute, Vizagapatam will help the readers to choose a good bacon pig which will not prove unprofitable.

1. **NEAT HEAD.** The pig that is very long in the head is usually narrow between the eyes, has seldom a very strong constitution, and has rather more bone than is required. On the other hand, the pig that is very short in the head is usually too fat, too heavy in the fore end, thick in the neck and heavy in the shoulders. Neat in the head means neither too long nor too short a nose. The ears should be fairly large, soft and pliable, and should fall little to the front without actually being lopped.

2. **LIGHT NECK AND SHOULDER.** The coarser parts of a side of a bacon and those which fetch the lowest price are



Fig. III. Staging & Pig's Bed.

the neck and shoulder. The lighter these parts, the better the side and the higher the price it will make.

3. **DEEP HEART AND WELL-SPRUNG RIBS.** Pigs are generally deficient in these points, but for stock purposes breeders should select only those animals, which have these characteristics strongly developed.

4. **THICK LOINS.** A pig with a good loin is almost invariably well ribbed, and has a strong constitution. From a breeder's and feeder's point of view, a good loin is most essential.

5. **STOUT THIGHS.** This means a pig thoroughly well developed in the hams. The hams are the most important parts of the animal, and, in the case of pigs killed for the ham and middle trade, the most valuable of all provided they are not too fat.

6. **SHORT LEGS.** A pig that is long in the leg is nearly always flat in the ham and lacking in plumpness.

7. **LONG AND SILKY HAIR.** Good hair is an indication of strength as well as lean meat. The absence of hair generally proceeds from close breeding and indicates a tendency to excessive fatness.

8. **A LONG SIDE** of moderate depth, with thick flank.

In addition to the above general characteristics which belong to all good pigs whether pure or cross bred there are several special points to note in both the sow and boar.

Sow. A good sow should (1) be of a quiet and easily satisfied disposition; (2) possess at least twelve teats of equal size placed as nearly as possible, equidistant from one another and commence

ing close behind the fore legs. It is advantageous to have more teats also; (3) be long and deep of body for on her digestive organs will depend her success as mother. They are called upon to do more work at certain times than the digestive organs of any other animal, and the success of her litters is largely determined by the amount of food which those organs can make ready for conversion into milk; (4) be 'roomy' for a small sow cannot be expected to produce large pigs or so many of them.

BOAR. (1) A good boar should not be less than nine months old if required for immediate use and not more than four years old; (2) have a quiet disposition; (3) be strong in the merits of his breed, character and combine size and quality. Size and coarseness however do not always indicate strength; (4) be neat and compact with plenty of masculine character. Boars are commonly expressed as half the herd and with the help of a good boar a herd equal to pure-breds in every way, so far as pork production is concerned can be established in a very few years. No class of animals increase so rapidly as pigs and none so readily retain acquired characteristics.

CROSS BREEDS. For the ordinary cottager or small capitalist a good sow, crossed with a really pure-breed boar, is in all respects likely to be quite as profitable as a more ambitious venture.

In every district of India there are breeders from whom young pigs of either sex can be bought at reasonable price—youngsters of from eight to ten weeks old will suit our purpose and cost us

Rs. 1-8, to Rs. 2 each. Little pigs ought to be in a thriving and growing state and should have been well treated from the birth. If well-managed they will increase at the rate of a score pound per month and produce carcasses of 160 lbs. weight when from seven to eight months old. This is a sanguine view of pig-rearing and is often achieved by successful management.

PIG HOUSES.

The importance of having sound, healthy and suitable housing for pigs is overlooked, or not understood by a very large number of pig-owners. Rearing pigs in cold, damp and dirty surroundings is risky and gives occasion for disease. Experience shows that pigs kept under good conditions thrive better and fatten quicker than those kept in filthy surroundings. The labour and expense of building a good sty and of keeping it properly should never be considered a waste. The size and kind of pig-house must depend on the scope of the piggery and the plans must be adapted to meet the different requirements of breeding or fattening. The building materials, easily procured locally viz,—stone, brick or wood may be used for the purpose and it is obviously useless to build an expensive sty but every pig-house should possess all the following important factors.

FRESH AIR AND SUNSHINE. Every sty must get as much sunlight, fresh air and dry footing as far as a builder can provide. Always the situation should be on dry ground and face the south so as to get full benefit of sun and air. Ventilation is also important, but not at the

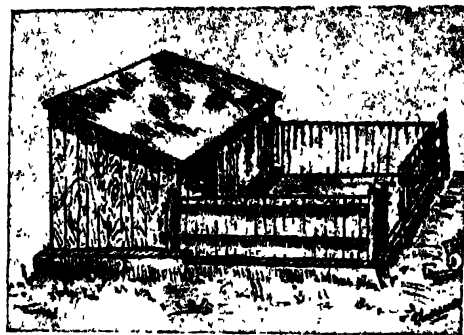


Fig. IV. A Pig-Sty of Timber.

expense of draughts. The trouble of draughts is not much to be met with to the south of Deccan but only in the north. There is no other animal requiring so much sunshine as the pig. For while the horse and cow have thick cold-resistant skins and the fowls have feathers on, the pig has only thin skin and few hairs.

The best way to guard against loss when a sow has farrowed in winter is to allow the greatest amount of sunshine to fall upon the floor of the farrowing pen. "Dryness, sunshine, warmth, fresh air, freedom from draughts and exercise," according to a well-known authority, "are of primary importance in raising pigs. These secured, the battle is half won."

FLOOR. "The most important part of every sty is the floor and clear drainage. Swine should never lie on the floor as it may become a breeding-place for parasites of all sorts and thus cause sickness. We recommend reinforced concrete floor sloped towards the entrance by 1 or 2 inches keeping the surface rough and cutting grooves that run diagonally in parallel lines and crossed to avoid a slippery floor lest the pigs should hurt themselves. The outer court should be

lower than the bottom of the inner court by about two inches.

WALLS. These may be built of stone or brick, procured locally but wood walls serve our purpose. On no account should old planks and parts of packing cases be used; old railway sleepers, if available in good condition, when well-bedded give a strong sty, but they must be tarred. Such wooden structure must always be built on strong basement built of brick or stone in lime mortar. The joint of the wall and the floor should be carefully attended to. Concrete walls can be built but we think they are expensive. A sheeting of zinc to a height of 3 feet screwed on the inside of the wooden walls saves destruction by the pigs. There should be few gaps in the walls to allow air but it is better to fix small mesh netting to them to prevent the entrance of rats.

ROOF. What is generally known as the "lean-to" roof by the Engineers is the best design for a pigsty. Tiles, asbestos sheets or thatch may be used. A glass pane embedded in the roof will admit light, if a proper window cannot be built. Fig 4 shows a complete sty.

DRAINAGE. The health of the pigs is also ensured by good drainage. All liquid matter must run from the inner court to the outer court and so on to the bottom of the sty. From there it should be led away by an open drain to a swamp at some distance, far enough to keep the sty fresh and clean.

INTERNAL FITTINGS. Internal fittings necessary in the sty are comparatively few. The first requisite is a staging on which the pig's bed is made up. Pigs

should never be allowed to lie on dung or the cold floor.

This is a precaution against the so-called epidemic 'swine fever' from which pigs generally suffer. The staging should be high enough to allow free ventilation. Old railway sleepers on thick planks of wood not less than two inches in thickness may be used. Some pig-keepers even have an upper storey to their ties to which the pigs soon learn to climb. This plan economises space and keeps the bedding clean. Fig. 3 shows the sty stage.

Next comes the trough which can be built up with brick in cement mortar or made of earthenware or iron firmly fastened to the ground and in such a position that the pig may come straight out of the inner court to its food. It is better to have a hole in the wall fitted with an earthenware pipe just over the trough so arranged that the pig's food can be poured straight into it without entering the sty. There should be also a hole in the bottom of the trough towards the side to facilitate cleaning daily. If a number of pigs are kept in a sty arrangement should be made to prevent the animals crowding together.

"If the sty is to be used as a farrowing pan" says a writer, "it will be necessary to fix a piece of piping along the wall nearest the bed, standing a few inches out so as to prevent the sow overlaying her young."

GATE. This should be strong and well fastened by hinges to the wall, secured by a zinc plate inside. If a gate between the inner and outer court is preferred, it is better to make it in two parts, the

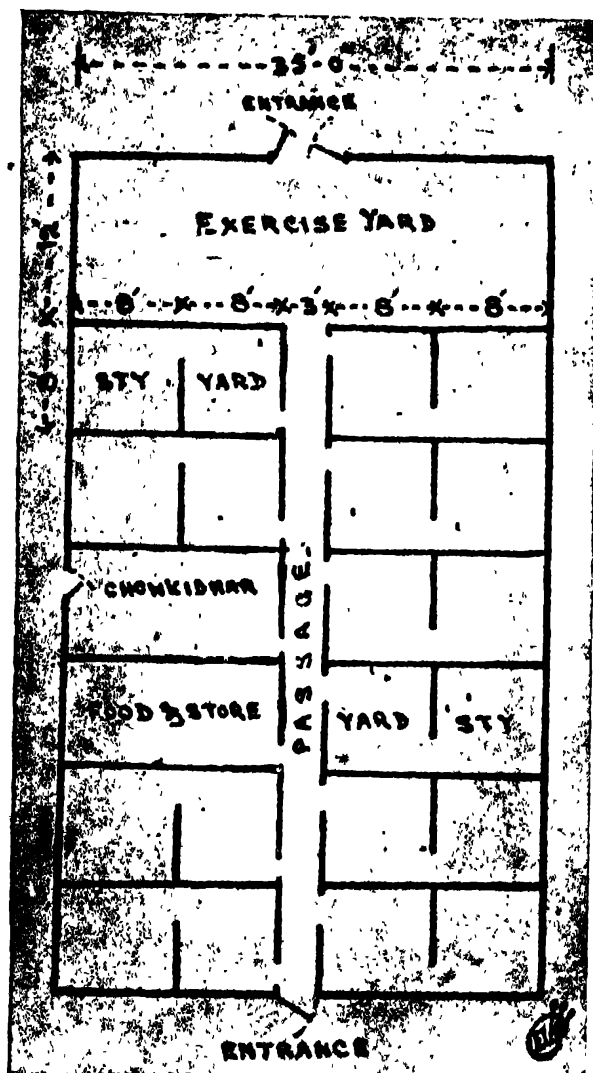


Fig. V. Plan of a Piggery.

upper can be bolted at pleasure and the lower may swing freely without quite touching the ground.

" **ARRANGING A SERIES OF STIES.** If a really large number of pigs are kept it is necessary to put up a series of sties. The type of sty described may be erected in pairs or dozens without any additional difficulty.

Fig 5 is a good arrangement designed by the writer for a fairly large piggery containing ten sties and yards, passage, cooking house, (watcher's) quarter, food store and exercise yard. These sties may

vary in size according to the breed of pig kept, a sty taking 8 feet by 8 feet with a yard of equal dimensions.

HOUSING OF YOUNG PIGS. An open space lying high and dry beyond the farm buildings is walled round with hurdles thickly covered with leafy branches and secured by stakes firmly driven into the ground, the entrance to the square being on the south. On the north and east another row of hurdles are planted at a convenient distance apart and covered with a slanting roof heavily thatched, the covered passage thus formed is only open at each end like an L-shaped tunnel. In this warm yet airy run-away the young ones varying in number from 30 to 50 sleep. They can run about in the open portion of the enclosure protected on all sides from wind and open to the air and sun. The tunnel is kept warmly bedded with straw removed now and then. The whole erection is so simple in construction that it can be easily removed on to fresh ground when required.

—By Mr. E. Lakkaraju Naidu.

To remove red ink stains from table linen, spread freshly—made mustard over the stain and leave for half an hour. Then sponge off, and all trace of the ink will have disappeared.

Equal parts of ammonia and turpentine will take paint out of clothing. Saturate the spot two or three times, and afterwards wash out in soapsuds.

Eggs are used in the bookbinding, sugar refining and fancy leather industries and in the making of wine and paper.

PREPARATION OF FLORAL OILS.

(BY A PRACTICAL EXPERT.)

IT will be apparent from the accompanying recipes that the general process underlying the preparation of floral oils is the same. Fresh scented flowers are selected; and after removing the stalks they are steeped in sesamum oil. They are then heated together on a water bath or placed in the sun for some time. By this method the odoriferous principles of the flowers is absorbed by the oil. If desired the process is repeated to make the oil strongly perfumed and concentrated.

The wet pulp of flower and oil is pressed to extract the oil which is filtered and bottled. The soaked flowers are placed on a funnel allowed to drip and the refuse thrown away.

KAMINI OIL.

Take 2 srs. of *Kamini* flower (free stalks) and 4 srs. of sesamum oil together in an aluminium pan and cover up and heat in water bath for half an hour. Then pour the mixture in a wide-mouthed bottle, cork it tight and place in the sun continually for 15 days. Finally strain through a piece of flannel, and put the oil in airtight bottles.

LEMON FLOWER OIL.

Take 1 seer fresh lemon flower, free them from stalk: also take $2\frac{1}{2}$ srs. of sesamum oil; put the two together in a jar and place in the sun continually for a month. Then strain the mixture and drain the flowers. Now take another seer of fresh flowers and put them in the above filtered oil. Put the mixture in a pan, cover up and heat in the water bath

for half an hour. Set the pan aside for 24 hours and then strain the oil.

GANDHARAJ OIL.

Grind thoroughly $2\frac{1}{2}$ srs. of sesamum and mix with the paste $2\frac{1}{2}$ srs. of *gandharaj* flowers. Put the mixture in a suitable vessel, cover up and place in the sun for 7 days. Then mix 2 srs. sesamum oil into it and heat the mixture on the water bath for one hour. Cover up and set aside for 24 hours. Then strain and put the oil in a bottle. Squeeze the soaked flowers, and mix the oil obtained with the above. Finally filter the whole quantity of oil.

MALLIKA OIL.

Take $2\frac{1}{2}$ srs. *Mallika* and 2 srs. of sesamum oil. Put the two together into a wide-mouthed bottle and close air-tight. Place the bottle in the sun for a month. Then strain through a piece of flannel. Put the soaked flowers in a funnel and allow to drip. Mix the two oils together.

HENA OIL.

Take $2\frac{1}{2}$ srs. sesamum oil in an aluminium vessel, cover up and heat in a water bath for an hour. Then put 1 sr. *Methi* flowers into it and set aside for 24 hours. Then press the oil from the flowers. Take the pressed oil in the vessel and heat it again in the water bath for half an hour. Now steep into this oil a fresh lot of 1 sr. flowers, set aside for 24 hours, and then press out the oil. Put the oil in a wide-mouthed bottle; steep in it $1\frac{1}{2}$ srs. flowers, cork it air-tight and place the bottle in the

sun for a fortnight. Finally filter the oil through a piece of flannel. Put the soaked flowers in a flannel and mix the drippings in the original oil.

GUL HENA OIL.

Take 1 sr. *Methi* flower, $\frac{1}{2}$ ch. saffron; and $\frac{1}{4}$ sr. sesamum. First grind the saffron and sesamum together into a fine paste, on a clean stone slab with a muller. Now pour into the paste $1\frac{1}{2}$ sr. of sesamum oil. Soak the flowers into the mixture. Cover up and heat in the water bath for half an hour. Set aside the vessel of 24 hours. Strain the whole mass through a flannel squeezing it to press the oil. Put the pressed oil in a wide-mouthed bottle and steep in it another lot of 1 sr. flower. Place the bottle in the sun for 20 days. Finally filter through flannel and store in jars.

MUSK HENA OIL.

Take 2 srs. of *Methi* flower, $2\frac{1}{2}$ srs. of sesamum oil and 2 as. of musk. First of all macerate the musk in a stone mortar in 1 ch. of oil thoroughly. Put the colate in an aluminium vessel with the flowers and heat it in the water bath for an hour. Then remove and set aside the vessel for 3 days. Next put the oil in a wide-mouthed vessel, close up tightly and place it in the sun for seven days and in the dew at night. Finally strain through a flannel and bottle.

BELA OIL.

Take 1 sr. fresh *Bela* flowers and $2\frac{1}{2}$ srs. of sesamum oil. Put the two together into a wide-mouthed bottle; close it up tightly and place in the sun for seven days and in the dew at night.

Then strain through a flannel taking care that the flowers are not mashed. Put the flowers on a funnel and allow to drip. Collect this oil in an aluminium vessel and steep into it another lot of flower, heat the vessel in the water bath for an hour and set aside for 24 hours. Now filter the oil, steep into it a third lot of 1 sr. flowers and heat in the water bath for half an hour. Finally filter. In this way a highly concentrated oil will be obtained.

JASMINE OIL.

Take several pieces of white cotton-cloth, soak them in olive oil, rasp and wring out. Spread a piece of cotton cloth thus wetted at the bottom of a suitable vessel and lay out a quantity of Jasmine flower on it. Cover it up with a second piece of cotton cloth and again lay out flowers over it. Cover it with a third piece of cotton cloth. Now pour a quantity of oil on the arrangement of layers. The oil should be double the quantity of flowers. Set aside for 24 hours. Then press the soaked flowers and collect the oil. Repeat the process seven times. Finally strain and squeeze the oil and bottle.

TUBEROSE OIL.

Take 3 srs. pure olive oil and $1\frac{1}{2}$ srs. tuberose. Put the two together in an aluminium vessel. Cover up and heat in the water bath for half an hour. Remove, set aside for 24 hours, and press gently to squeeze out the oil. Collect it in a wide-mouthed bottle and steep in the oil another lot of 2 srs. flowers. Close air-tight and set aside for a month. Finally express the oil, filter it and bottle.

ROSE OIL.

Take $\frac{1}{2}$ sr. of sesamum oil in a suitable vessel and throw into it $\frac{1}{2}$ sr. petals of fresh roses of the same colour. Cover up and heat in the water bath for half an hour. Set the vessel aside for 24 hours. Pour out on a piece of clean cloth and wring to press out the whole oil. Again steep a fresh lot of $\frac{1}{2}$ sr. rose petals in the expressed oil and follow the above directions. If the process be repeated 7 or 8 times the final product will be of excellent quality and highly priced.

BAKUL OIL.

Take 1 sr. *Bakul* flowers and 1 sr. sesamum oil. Put the two together into a jar, close up the mouth and put it in the sun for a month. Then express the oil.

KETAKI OIL.

Take 1 sr. pollen of *Ketaki* flower; $\frac{1}{2}$ sr. minced petals (white and tender), and 2 srs. of sesamum oil. Put these ingredients together in a jar, close up the mouth and place it in the sun for a month and in the dew at night. Then pour out into a cloth and express the oil. Finally filter and bottle.

JHANTI OIL.

Take 1 sr. of dry *Jhanti* flowers and 1 sr. sweet oil. Put the two together into a bottle and place in the sun for a month. After that press the oil and collect it in an aluminium vessel. Steep into it a second lot of 1 sr. fresh flowers. Cover up and heat in the water bath for half an hour. Remove and set aside for 24 hours. Finally strain through a piece of flannel.

CHAMELI OIL.

Take 1 sr. *Chameli* flower and 1 sr. sesamum. Lay out the flowers in an aluminium vessel, strew over them the sesamum. Pour on the layers 1 sr. sesamum oil; close up the mouth and place it in the sun for 3 days. Now pick out the exhausted flowers and put in another lot of 1 sr. flowers instead. Cover the mouth and place in the sun for 7 days. Again pick out the exhausted flowers and put a third lot of 1 sr. flowers instead. Cover the mouth and place in the sun again for 15 days. Now finally pick out the exhausted flowers and express the mixture of sesamum seeds and oil to obtain a nicely scented oil.

CHAMPAKA OIL.

Put 200 *Champa* flowers in a jar and pour $2\frac{1}{2}$ srs. sesamum oil into it. Close up the mouth and place in the sun for 7 days and in the dew at night. After that period press out the oil and collect the same in the jar. Put in a second lot of 200 flowers and place in the sun for 7 days and in the dew at night. Then press out the oil and again put in flowers. If this process be repeated eight times a highly scented oil may be obtained.

KANTALI CHAMPAKA OIL.

Take 100 fresh *Kantali Champa* flowers and $1\frac{1}{2}$ srs. good olive oil. Put the two together into an aluminium pot, cover up and heat in the water bath for half an hour. Remove the vessel and set aside for 24 hours. Strain through a funnel and put in a bottle. Now take the oil again in the vessel, put in a fresh lot of 100 flowers, heat again for half an hour and set aside for 24 hours. Press

out the oil, collect it in the vessel, put in a third lot of 100 flowers, heat for half an hour and set aside for 24 hours. Finally strain and bottle. The soaked flowers may be squeezed to yield oil.

NAGESWAR CHAMPAKA OIL.

Take 1 sr. of *Nageswar* flowers free from stalks and 1 sr. sesamum oil. Put the two together into a wide-mouthed bottle and place in the sun for 2 days, and in the dew at night. Strain the oil and put it again in the bottle, steep a fresh lot of $\frac{1}{2}$ sr. flower; set aside for 24 hours and strain the oil. Put in a third lot of flower in the oil; set aside for 24 hours and finally press out the oil, filter and bottle.

JAHURI CHAMPAKA OIL.

Take $\frac{1}{2}$ sr. newly blown *Jahuri Champaka* flowers and 10 srs. almond oil. Reject the green portions of the flowers and put them in a bottle. Pour in the oil and place in the sun for 15 days and in the dew at night. Then strain the oil and steep in it, another lot of $\frac{1}{2}$ sr. fresh flowers, close up the mouth and place in the sun for 15 days. Finally press the oil, filter and bottle.

DOLAN CHAMPAKA OIL.

Take 250 *Dolan Champaka* flowers and $2\frac{1}{2}$ srs. of sesamum oil. Put the two together into a wide-mouthed bottle and place in the sun for 15 days. Strain through a funnel and allow to drip. Steep a fresh lot of 250 flowers in the oil; put in a wide-mouthed bottle and place in the sun for 15 days. Strain again and steep in the oil a third lot of 250 flowers. Place the bottle in the sun for 7 days. Strain and bottle the oil. Collect all the soaked flowers in a piece of flannel and

squeeze gently to press out the oil. Mix this oil with that obtained above.

MADHUMALATI OIL.

Procure 1 sr. *Madhumalati* flowers free from stalk and 1 sr. sesamum oil. Take a big-sized aluminium vessel and strew at its bottom 2 ch. flowers. Lay out over them loose cleaned cotton thickly so as to cover thoroughly. Pour on the cotton 2 ch. oil and strew with another layer of flowers. Lay out on it another pad of cotton, pour 2 ch oil on it and strew flowers. Repeat in this way to make 8 layers. Close up the mouth of the vessel and place in the sun for 24 hours. Now press the cotton and flowers together to obtain the oil.

Do not throw away the cotton pads. Take a fresh lot of flowers; strew a quantity at the bottom of the vessel; lay on it the wet cotton; pour the above extracted oil and arrange in 8 layers. Place in the sun for 24 hours and press the cotton and flowers as before. If this process be repeated for 5 times a good quality of oil will be obtained.

KHUS KHUS OIL.

Take 2 srs. *Khus* root and 1 sr. sesamum; grind the two together into a paste on a clean stone slab and muller. If the materials are too dry they may be moistened with a little sesamum oil. Put the paste in a jar, pour into it 2 srs. of sesamum oil and bury the vessel in the earth for one month. The mouth of the jar should be covered with a lid and plastered with mud. After the lapse of the period bring up and extract the oil to the last drop by pressing hard. Collect the oil in a wide-mouthed vessel. Now take another seer of *Khus* clean it

thoroughly from dirt and pound it finely in a *Dhenki* (country made rice huller) or in iron mortar and pestle. Throw the powder thus obtained into the extracted oil above; cover up the mouth of the bottle, place in the sun for 16 days. Finally extract the oil by pressing hard.

LOTUS OIL.

Procure 5 srs. of white petals of lotus and 5 srs. sesamum oil. Put the two together into a vessel and heat on the water bath for an hour. Remove and set aside for 24 hours. The operations should be carried on under cover. Extract the oil by pressing the soaked petals. Again put $2\frac{1}{2}$ srs. petals in the oil heat in the water bath for half an hour. Set aside for 24 hours and extract the oil by pressing. Steep a third lot of 1 sr. flower in the extracted oil, heat on the water bath for half an hour, set aside for 24 hours and extract the oil. Steep again a fourth lot of $\frac{1}{2}$ seer petals in the extracted oil, place in the sun for 15 days. Extract the oil by pressing; filter and bottle.

GLOSSARY.

For the sake of convenience the Bengali names only of the flowers are appended to the oils derived from them respectively. We endeavour to give their English and botanical names together with vernaculars as far as practicable.

Bakul—*Mimusops* Elengi; Mulsari; Borsali.

Bel—Arabian Jasmine.

Chameli—Catalonian Jasmine.

Champa—*Michelia Champaca*; Champaka; Shampang.

Dolan Champa—*Plumeria*; Kanagala, Gulachin.

Hena—*Lawsonia*; Mehndi, Marithondi.

Gul Hena—i.e., Hena with saffron.

Musk Hena i.e., Hena with musk.

Gandharaj—*Gardinia* or Cape Jasmine

Golap—Rose.

Jahuri Champa—*Magnolia Mutabilis*.

Jhanti—*Barleria*; Tadrelu; Koilka.

Jui—*Jasmine auriculatum*.

Kanthali Champa—*Artabotrys odoratissimus*; Madmanti; Manoranjitam.

Kamini—*Murraya Exotica*; Marchula; Naga golunga.

Kea—*Pandanus odoratissimus*; Keora; Kenda, Talum, Tsattha-pu.

Khus—Vetiver; Bena, Panni, Valo.

Madhumalati—*Echites caryophyllata*.

Mallika—*Jasmine arborescens*; Adavi

Nageswar Champa—*Mesua Ferrea*;

Nebuphul—Lemon flower.

Padma—Lotus.

Rajanigandha—Tuberose.

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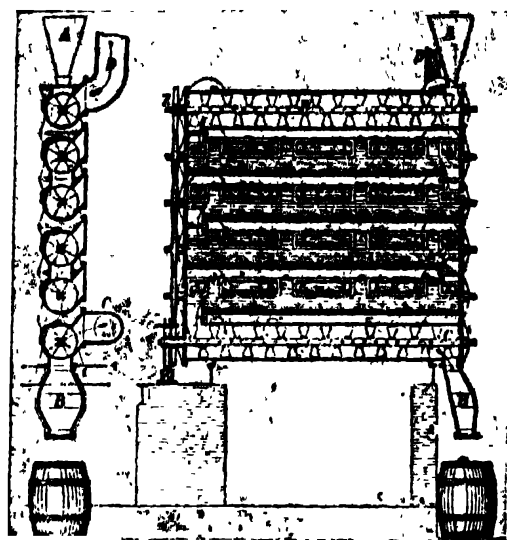
BLEACHING POWDER.

BLEACHING powder is prepared by the action of chlorine on lime. We describe briefly two different processes. The diluted chlorine evolved from the Deacon process is utilised in making good bleaching powder with what is known as the "Hasenclever's Cylinder Apparatus."

The apparatus consists of six or eight cast-iron cylinders lying vertically one above the other, of length some 12-20 ft., each provided with a feeding worm W, which is kept revolving slowly by means of the cogwheels Z. The slaked lime is poured in at A into the top-most cylinder, and is gradually moved downwards, as indicated by the arrows, from cylinder at B. Meanwhile the Deacon Chlorine, freed as much as possible from hydrochloric acid and carbon dioxide is passed at C into the bottom cylinder, and streams along in a direction opposite to that of the moving slaked lime, finally escaping at the topmost cylinder by the pipe D. The chlorine is all absorbed by the lime, and there escapes at D a practically chlorine-free gas. The bleaching powder is let out from B from time to time into a wooden cask situated below. Since chlorine gas might attack the iron work of the spur wheels, the latter are painted with barium sulphate (Blanc fixe). Each of the cylinders is provided with a number of lids K, K, which can be removed when the apparatus becomes blocked up, or when some other disturbance necessitates the interior of the cylinders being investigated.

By this apparatus no danger results to the workmen because they do not come into contact either with the lime dust or with the chlorine fumes. The resulting bleaching powder contains about 36 per cent. of available chlorine.

For the manufacture of good bleaching powder, the lime must be specially



Hasenclever's Cylinder Apparatus.

pure, well slaked, and free from lumps, and it should contain no magnesia. It is exposed to the action of chlorine, made by the manganese process and therefore nearly pure, spread on the floors of chambers of brick work or lead or cast iron, six feet high, and of considerable area; these chambers are protected internally by a layer of cement and tar. The gas is introduced in the roof, and descends, owing to its weight. The progress of the operation is seen through windows in the cast iron doors; when the chambers are seen to be green, admission of chlorine is stopped. The chlorine being forced in under a slight pressure, some fresh lime is thrown in to absorb that remaining in the chambers; workmen then enter their mouths protected by bandages of wet cloth, and rake the powder so as to expose fresh surfaces. Chlorine is again introduced, and when absorption again ceases, the powder is removed and packed in casks. The amount of available chlorine is usually 37 to 38 per cent. but may in exceptional circumstances rise to 43 per cent. During the whole operation the temperature is kept as low as possible.

Small Trades & Recipes.

Infant's Cordial.

Light Carbonate of Magnesia	2 gr.
Sodium Bicarbonate	1 gr.
Spirit of Chloroform	1 min.
Glycerin	5 min.
Peppermint water to 1 fl. dr.	

Metal Polish.

Rouge . . .	2 oz.
Rotten Stone .	2 lb.
Ground Silica .	4 oz.
Soft Soap .	8 oz.
Strong Solution of Ammonia	2 fl. oz.
Water (hot) .	12 fl. oz. or sufficient.

Dissolve the soap in hot water and mix with other ingredients, adding ammonia last. The product will be a paste.

White Enamels for Jewellery.

Two parts of tin and one of lead are calcined together and entirely converted into the respective oxides; 1 part of the mixed oxides is then mixed with 2 parts of pulverised white crystal glass and fused in a crucible along with a minute quantity of saltpetre or manganese dioxide as a decolorant, the molten mass being afterwards poured out into cold water. This fusing and quenching are repeated two, three or even four times, until the mass is free from bubbles and quite homogeneous. After being ground to fine powder it may either be applied direct to the object, or when intended for covering very small surfaces, is ground in lavender oil and laid on with a brush in the same manner as artists' colours.

Water Biscuits.

I.

One pound of flour and a little salt. Mix into a nice dough with about three-quarters of a pint of thin cream, beat it well, roll out very thin. Cut in large pieces and bake in a hot oven. Keep turning or they soon burn.

II.

One pound of flour, one teaspoonful of salt, one ounce of butter dissolved in about half a pint of warm milk. Mix into a rather stiff paste and beat it well with rolling-pin. Then roll out very thin, stamp out the biscuit and bake in a hot oven for a few minutes.

Artificial Indigo.

For making indigo by chemical means, an expensive process, a solution of a isatine anilide may be reduced with ammonium sulphide. In the process 40 kg. of a freshly prepared ammonium sulphide solution, containing 10 per cent. of hydrogen sulphide, is made to flow quickly, and with constant stirring, into a heated solution of 20 kg. of isatine-anilide in 60 kg. of alcohol. There is spontaneous heating, temporary green and blue coloration, and an immediate separation of indigo in the form of small crystalline needles of a faint copper-like lustre. The heating is continued, presumably by external means, to boiling point, when the indigo is obtained by filtration, re-washed with alcohol, and dried.

INDIA'S INDUSTRIAL PROGRESS.



Mineral Industries Of India.

From 1919 to 1923 there was a remarkable advance in the mineral industries of India the value of the total output being double the amount for the corresponding period. In the latter, the average annual value of the output, for which reliable statistics are available, was about £11,800,000, while during 1919-23 it reached £24,600,000. The comparison must be discounted to the extent of the universal rise in price, not only of minerals but of all commodities, and also by the high value of the rupee during 1919 and 1920.

Cottage Industries Of Ceylon.

It is reported that a big effort is to be made shortly to popularise cottage industries in Ceylon. The show room of the Cottage Industries Society situated in Short's Road, Slave Island, has not been exactly serving its purpose. From this year the show room will be situated in a part of the Low-Country Products Association Chamber in Queen Street, Fort. It is hoped that the new show room will attract more visitors and that the returns will be increased. A step is to be taken to improve the standard of articles displayed for sale in future. As complaints have been made in the past that some of the goods which have been sold were of a poor class, it has been decided to appoint a selection committee, which will pass every article before it is displayed for sale.

Paddy Cultivation In Madras.

At present the Government of Madras runs three paddy farms, one at

Coimbatore, one at Aduthurai in the Tanjore district, and the third in West Godavery. A fourth farm is to be shortly established near Pattambi in Malabar. At all the farms problems connected with the cultivation of paddy and the selection of purer and better strains of paddy seeds are studied and already in many parts of the Tanjore district the ryots have been putting to practical use the knowledge gained from the experiments carried on at the Aduthurai farm. It has been clearly demonstrated that if the purity of the strains is preserved where paddy is concerned, it is possible to increase the yield of the land by at last 16 per cent. per acre.

Indian Tobacco And Cigar.

The most important tobacco growing tracts in India lie in the provinces of Madras, Bengal, Bihar, Burma and Bombay, the area occupied by the crop is nearly a million acres. The agricultural department is endeavouring to increase the outturn of better quality of Indian cigars through selection of leaf and to decrease the imports of foreign cigarettes by producing tobacco suitable for their manufacture in India. The Pusa Selection 28, which is a tobacco of light colour and good texture and altogether suitable for cigarette-making, is being favoured by the cultivators in Bihar, Madras and Burma. At the Bengal farm, at Basirhat, the reputation of the Sumatra leaf has been well established. Efforts are being made there to find out a better filler than Sumatra in order to establish cigar-making as a successful enterprise.

SCIENTIFIC AND TECHNICAL TOPICS.

Brains Broadcasting.

Certain believers in mental telepathy have declared for years that when we think the brain sends out actual waves. These are carried through the air may be received and understood by another person whose brain is attuned to the particular wave length transmitted.

An Italian scientist, has just experimented with highly excitable persons, suffering from mental ailments. He put isolated men and women in an insulated cabinet, hypnotized them, stimulated their mental faculties, and listened to the reactions through a wireless head-piece attached to his ears.

He declares that he heard waves similar to radio telegraphic transmission sounds, which stopped immediately upon waking the subject. Sometimes, the sounds were accentuated until they resembled whistling or the tone of a muted violin.

A Paper Sheet Feeder.

A feeding device for use in printing, folding, and ruling machines, in which a combing wheel on each side of the paper sheet is controlled by a feeder which is lifted as the sheet enters between the run-in rollers. This releases a tooth from a catch to permit a spring to rotate an arm which then presses a detent into engagement with a continuously rotating toothed disk. A cam loosely mounted on the rotating shaft is thus carried

round until the combing wheel lifting roller enters a depression as a striker engages the arm, and trips the detent. When the leading edge of the rotating cam slightly lifts the roller the floating cam is released and carried back by a weight until a tooth engages with a stop finger. Before the cam is released a cam lifts a resetting finger to bring the catch into position to be engaged by the tooth when the sheet has been drawn clear of the feeder.

Cure By Colours.

An authority on the subject of colour treatment for certain diseases, states that he has had successful results with such treatment in cases of neuralgia, neuritis, insomnia, high blood pressure, mental depression, and other health disorders.

The three most useful colours are green, blue, and orange.

Green has a remarkably soothing effect upon the nervous system: it gives a sensation of warmth, and relieves pain and lowers blood pressure.

Blue contracts the capillaries (the smallest of the blood vessels), gives a sensation of coolness, and tends to raise the blood pressure; it also acts as a tonic.

Orange is a general stimulant, tonic and vitalizer.

The treatment is given by means of a 1,000 candle-power lamp, and the

patient wears a minimum of clothing preferably a white gown.

Scouring And Dyeing Machine.

A machine for scouring, dyeing and impregnating woven fabrics and chain warps, which, it is stated, has a large production capacity, has recently been patented. It is claimed to give an entirely new method for scouring wool goods, dyeing and scouring cotton goods, dyeing and scouring chain warps, and impregnating for water-proofing and flame-proofing.

The new machine is continuous throughout, and can be connected whenever space permits with tenting and drying machinery. It treats in open width, and forces the liquid to penetrate the fabric. With 25 r. p. m., of the eccentric shaft, the frames which hold the fabric are moved through the liquid 50 times. It is intended to use six frames for heavy goods, four for medium weights, while two frames should be sufficient for light fabrics.

For dyeing and scouring cotton goods, the operation is also continuous. The machine takes the goods from the truck, wets them out when desirable, dyes them, scours them, neutralises when required and gives a final scouring. The dye liquor is fed automatically. The production is high, and penetration is stated to be thorough in both scouring and dyeing. The ability to cause good penetration makes the machine extremely useful for waterproofing and flameproofing. Chain warps can be dyed and scoured in series of four or more, running parallel on the same machines that are used for woven fabrics.

Plastic Cinema Films.

Burkhardt's Plastic Films, displayed for the first time in London, certainly mark a distinct advance in the art of the cinema. They have the stereoscopic effect, the figures seem solid and real. They are chiefly dancers of various kinds and had the opening dance of young girls been shown without comment or explanation few in the audience would have suspected that they had not the girls actually before them.

The new device may lead to better reproduction of scenes in which the parties are too deeply engrossed in one another to give much thought to the audience, as in boxing and wrestling contests.

Vegetable Ivory.

Vegetable ivory is one of nature's wonderful products that may be used for practically everything for which tusk ivory is used. It is derived from the nut or seed of a palm, that grows in Central and South America. The seeds grow in the fruit or head of the palm, which is about the size of a man's head and weighs from 25 to 30 pounds. Usually a head contains from 40 to 50 nuts.

The seeds are solid, white, and hard and, when polished, scarcely can be distinguished from animal ivory. The unique product is used in the manufacture of door knobs, umbrella handles and small ornaments, but its chief use is in making buttons. These ivory seeds form the chief industry of the interior of Colombia.

The United States imports more of this ivory than any other country.

FORMULAS, PROCESSES & ANSWER.

Curing and Smoking Bacon.

3128, F., Margao.—Asks, How to cure and smoke Bacon?

A good recipe for curing bacon is as follows:—

Take fine dairy salt, 50 lbs; brown sugar, 5 lbs., saltpetre, 2 lbs. Mix well. Rub in over the flesh and around bones and joints for three or four days. Afterwards spread the mixture freely each day. Change the sides each day, so that the one on top one day is at the bottom the next. Requires about fourteen days, if smoked afterwards

Smoking bacon acts as a preservative by bringing about dryness and driving off moisture, which favours germ production. After curing mildly, trimming, and dusting with pease meal, bacon is smoked at a temperature of 85 degree F, the smoke being usually produced from wheat and barley straw and hard wood saw dust. Hams are usually best smoked in specially constructed smoke rooms or stoves, where they may remain from three to thirty days longer. In deciding the length of time to apply smoke, notice must be taken of the colour of the meat, which should be of a light brown. Smoke must be cool when coming in contact with the bacon and moderate smoking for a length of a time is preferable to a short profuse exhalation.

Preserving Meat.

3200, A. S., Rampur State.—Wants to know the process of preserving meat.

The preparation of potted meat for home consumption can be effected with an autoclave. An ordinary fireplace, will be quite sufficient, with a few large and small iron pans, a mincing machine. and a few perforated cages. For success the meat should be fresh, the accessories should be adequate and cleanliness should be scrupulously adhered to. The tins should be easily manipulated.

The meat, whether boiled or roast, should be well cooked so that it shows no redness when cut through. Roast meat should be well browned, so as to have the characteristic aroma. Any vegetables new as garnish must be only slightly blanched

The meat is weighed into the tins in all cases, a quarter tin, weighing nearly 10 oz gross, always containing at least $\frac{1}{4}$ lb. of meat, except when garnished, in which case the meat will be about $\frac{1}{2}$ oz. less. Butter used should be fresh. The tins should be sterilised for 50 minutes at 250 degree F except in the case of veal or sausage, for which 45 minutes will suffice.

On removal from the autoclave, the tins are merely well rinsed over and then set one upon another, lids up, to cool.

Candle Making.

3116, L. A. S., Colombo.—Requests us to describe the methods of manufacturing candles.

The materials used for candles are: free fatty acids like palmitic and stearic;

hydrocarbons, such as paraffin and ozokerite, and certain esters of the fatty acids, such as tallow and waxes.

Candles are made by dipping, pouring and moulding. For **dipped candles**, the wick is repeatedly introduced into the melted stock, each layer of fat being allowed to solidify before the next dip. Tallow dips, the poorest candles made are prepared in this way.

Poured candles are made by pouring the melted stock in a slow stream over the wick, which is stretched in a frame. This method is used for wax candles, since the wax contracts too much on cooling to allow casting. While still plastic, they are rolled on a flat table under a board, to give them a uniform diameter.

Most candles are now moulded in a cylindrical metal form through which the wick is drawn in the line of its axis. The mould can be surrounded with hot or cold water to facilitate the casting and removal of the candles. Wicks are of plaited or twisted cotton yarn, usually flat, except for tallow dips, when they are round. They are so prepared that the end curls over and burns off as the candle is consumed, thus making snuffing unnecessary.

Paraffin, ozokerite and sperm candles are moulded. In order to prevent softening at too low a temperature, and to render them less brittle when handled, a little stearic acid is usually added.

The most important candle stocks are palmitic and stearic acids and paraffin wax.

Preserving Vegetables.

3128, D. F., Margao.—Enquires how to preserve vegetables.

All green vegetables can be preserved by abstracting a certain amount of water by heat and then subjecting the vegetables to hydraulic pressure. The best plants are chosen and carefully washed and freed from woody parts as when required for immediate consumption. They are then dried in a current of warm air at about 50 deg. to 60 deg. C. The

vegetables are spread out in the drying room, either on wicker work or on perforated plates. The draught through the room can be obtained either with a fan or by means of a high chimney.

When the vegetables have shrunk a great deal, but are not yet brittle, the desired point has been reached, and they go to the press when they have lost from 80 to 90 per cent. of their weight. In the press the dried vegetables are piled up in a mass separated into layers of convenient thickness by iron plates.

Compressed vegetables must be kept dry, or they will very quickly become mouldy.

Milk Sugar.

3123, R. N. R., Bellary.—Wants to manufacture Milk Sugar.

Milk contains about 5 per cent. of milk sugar, which can be extracted by the following method. The bulk of the fat is removed by a separator for butter making, and the separated milk heated to from 75 to 85 degree C and treated with 10 per cent. of milk of lime, whereby the residual fat and casein are precipitated. Saturation with carbon dioxide follows, and the purified liquid is concentrated and the milk sugar crystallised. It may be purified by dissolution in water and precipitation by alcohol.

Renovating Old Painting.

3070, K. A. H., Adoni.—Asks how to renovate old oil painting.

To restore to its original colour an old oil painting that is black with age and smoke, wash it with a sponge or soft leather and clean water, and dry with a silk cloth. If the painting is very dirty, take it out of the frame and lay over it a clean damp cloth. Allow the cloth to remain for a day or two, keeping it damp all the time. Then remove the cloth and place another clean dampened one over the picture, and keep on renewing the cloth till the dirt is thoroughly soaked out of the painting, when it may be washed with a sponge and water. Then rub over the picture

a little clear linseed oil, or give it a thin coat of mastic varnish applied with a clean flat brush till every part is covered, and set aside to dry where no dust will fall on it.

Celluloid Manufacture.

2547, K. G. R., Malunga.—Wants to manufacture celluloid.

In making celluloid the first operation is the preparation of nitrated cotton, which is similar to gun cotton. Two parts of strong sulphuric acid are mixed with 1 part of concentrated nitric acid in a shallow stoneware vat. The cotton or tissue paper is weighed out into small perforated jars, each provided with a lid and when the temperature of the acids is 60 degree C, the jars are placed in the acid, which penetrates through the perforations to the cotton. After about forty-five minutes the jars are removed and placed in a vat of water, and fresh water is run through the vat to wash out the acid, the last traces being removed by a little ammonia or carbonate of soda. The nitrated cotton is next dried at a low temperature and is mixed with camphor and spirit of wine or with acetone, which will soften it. The mass is then kneaded and pressed into square blocks. Moulded articles are made from the plastic celluloid but some articles are cut or turned from the solid. The celluloid soon hardens in contact with air owing to the loss of the solvent. As a rule, a little castor oil is mixed with the celluloid to make it more flexible. As the process is attended with some risk it should be conducted very carefully.

Stencil Inks for Fabrics.

3228, N. C., Allahabad.—Wants to manufacture stencil inks for fabrics.

For an ink for stencilling cotton fabric that will resist the action of water proceed as follows. In a suitable vessel over the fire place 32 oz. of water and 4 oz. of shellac, boil until the shellac turns soft, then stir in 2 oz. of powdered

borax; this will form an aqueous solution, which should be passed through a fine strainer. In another vessel place $\frac{1}{2}$ oz. of lamp black and $\frac{1}{2}$ oz. of Prussian blue, both finely powdered, and 2 oz. of thick mucilage; mix well together into a uniform paste and thin down to the required consistency with the shellac solution. Stir well and allow it to repose a few hours, when it will be ready for use.

Removing Rust from Polished Steel.

3247, R. B., Karachi.—Wants to remove rust from polished steel.

To remove rust from polished steel such as razor blades, soak it for some time in best sweet oil, then brush over with emery powder, using a stiff brush, until the rust is removed. Polish off with flour emery powder, and finish with powdered lime.

Marking Inks.

3219, J. K. J. R., Tanjore.—Requires the formula of marking ink.

A jet black marking ink will be obtained by the following recipe. Dissolve 1 dr. of silver nitrate in a little water, slowly add ammonia until the oxide which first precipitates is redissolved, mix with a little indigo extract or sap green, and add strong gum water to make 1 oz. write with a quill pen, and afterwards run a hot iron over the writing. The following is a very fine indelible marking ink. Add caustic alkali to a saturated solution of cuprous chloride until no further precipitate forms; allow to settle, draw off the liquid, and dissolve the oxide in the smallest quantity of ammonia that will absorb it. Mix with about 6 per cent. of gum dextrine.

Ebonite and Vulcanite.

2394, P. K. R., Calcutta.—Asks how to manufacture ebonite and vulcanite.

These two materials are, practically the same substance the main difference being in the colouring materials used. They consist of India-rubber and sulphur,

practically the same as vulcanised India rubber, but a greater heat, and time, are employed to vulcanize the compound.

EBONITE.

Sulphur, 2 to 3 parts, is mixed with caoutchouc 5 parts, and cured for several hours at 75 degree C under a pressure of 4 to 5 atmospheres. Ebonite is apt to become porous and conductive in moist air or in sunlight. It keeps best when dry and in the dark. Heat softens and deforms it. To prevent loss of insulation by oxidation of the sulphur, the surface should be washed from time to time with boiling water, then rinsed with distilled water, and dried, the surface should be shellaced or paraffined, especially in moist climates.

VULCANITE.

About equal parts of rubber and sulphur are used, to which is added about 7 to 10 per cent of lamp black. These are all worked together in the masticating machine. A very useful vulcaniser for small goods is that made for dental work. Larger vulcanizers are steam jacketed. The heat for vulcanizing should be slowly raised, the whole process being extended to about 4 hours, the final and highest temperature being 150 degree C (302 degree F).

Crystallised Fruit.

1543, D. M. R., Calcut.—Enquires how to make crystallised fruits.

Syraup for the making of crystallised fruit is produced thus: Take white grain or lump sugar and dissolve it in hot water, and then boil until a few drops taken from the mass candies upon being cooled on a pottery plate or glass. The formic acid can be added and boiled in with the sugar to prevent fear of moulding.

This can be made at home very nicely. Select nice firm fruits. Cook it a little in clear water; the amount of cooking may be soon learnt. Place the cooked fruit into very thick hot syrup and let it stand for about two days; then drain off the syrup, which will now be very thin, and boil it down until it is

thick again; put in the fruit and let it heat through and stand for about four days then repeat the process, letting it stand longer every time. When the syrup no longer gets thin remove the fruits and dry it in the sun, or in an evaporator with gentle heat. It may be rolled in granulated sugar to fully dry it, and then may be packed in boxes for use. By using the first syrup for jelly, and making up some entirely new, the process can be hastened and the fruit will dry better; but will not be of quite so good a flavour.

Hardening And Softening Copper.

2867, R. E., Triplicane.—Wants to know the processes of hardening and softening copper.

The difference between hard rolled and special soft copper is caused by the methods of annealing. Hard rolled copper can be rendered soft and ductile simply by placing it over a fire or stove until well heated, and then gradually allowing it to cool. Copper may be hardened by well heating and then plunging it for a moment in cold water, afterwards allowing it to steam dry. If kept submerged until cold the metal will prove exceedingly brittle. In repousse work soft copper will crack whenever the tool is applied too forcibly; these cracks may be repaired by soldering from the back.

Preparing Menthol.

2837, R. M., Benares.—Wants the process of preparing menthol.

Menthol has a similar composition to camphor; it is obtained from peppermint oil, by cooling to a very low temperature, when the menthol crystallises out. It is purified by dissolving in a little alcohol and again cooling, when it separates again in crystals. The menthol is then melted at as low a temperature as possible and run into conical moulds. It would not pay to make this material in small quantities.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of **Industry** are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

2692 A. B., Nizamabad.—Photographic plates and sensitive paper are not manufactured in India. Preparation of sensitive paper and photographic plates will require large capital and expert knowledge. Mowha liquor may be purified. You may read good books on photography which may be supplied by Thacker Spink & Co., 3, Esplanade East, Calcutta.

2693 D. I. C., Madras.—Recipe of Kola Champagne essence will appear in an early issue. Recipe of pain balm appears elsewhere in this issue. Make the solution with equal quantity of tartate of soda and potash. For buying second-hand books go through the sale and Exchange pages of **Industry**.

2694 B. B. S., Lakhimpur.—There is no special arrangement for learning roof tilesmaking. Wishes to invest Rs. 1000 in a profitable business. For the book on agricultural subject write to the Director of Agriculture, Ramna, Dacca.

2695 B. V., Cocanada.—For learning bio-chemic treatment write to Samanta Biochemic Pharmacy, 48, Shambazar Street and for learning homeopathy write to Dr Bird, 104A, Cornwallis Street, Calcutta.

2696 M. S. S., Meerut.—Formula of printing varnish appears elsewhere in this issue. Golden printing is generally done by bronze powder. It will be advisable for you to consult some books on litho printing or you may consult an expert in that line. For various kinds of oxides write to Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta. Reply to your enquiry regarding tiles appears elsewhere in this issue.

2697 F. C., Jahania.—It is not possible to light lamps of 20 or 25 candle power with the help of some dry batteries. These only give tiny spark. Stammering may be cured by S. C. Bannerjee Deaf & Dumb School, 293, Upper Circular Road, Calcutta.

2698 R. C. R., Srinagar.—Teas of various sorts may be bought of Bhattacharjee & Co. Ltd., 64/1, Cornwallis Street; Hajee Ahmed & Sons, G 24 & 25 Municipal Market and M. K. Shirazi & Co., 12, Mission Row; all of Calcutta.

2699 B. L. D., Jammu.—The Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta may indent the pencil making machines on your behalf. As regards expert advice you may write to Mr. F. N. Gupta, 13 Belliaghata Road, Calcutta.

2700 K. V., Multan City.—For electric casing and capping enquire of B. M. Sing & Son., 201, Harrison Road and Ghose Chakraverty & Co., 223, Bow Bazar Street; both of Calcutta.

2701 L. H. K., Gursahaganj.—Coal may be bought of Bird & Co., Meston Road, Cawnpore; Bengal Coal Association Ltd, La Touche Road,

Lucknow and N. C. Sircar & Sons, 68 La Touche Road, Lucknow.

2703 S. I. H., Fatehgarh.—The following firms of Alleppey Madras Presidency may supply you coir matings. (1) Alleppey Produce Co.; (2) General Supplies Agency, Post Box 16; (3) Indian Coir Manufacturing Co. Ltd.; (4) Laxmidas Haridas & Co.; (5) Pothan & Co; (6) Travancore Produce & Industrials Ltd., and (7) Walker & Co.

2705 K. C. L., Khurda.—The right of publication and reproduction of the article is only reserved. All the ingredients required in the the manufacture of vermilion may be bought of Jadunath Ghar, Hookaputty, Barrabazar, Calcutta.

2707 G. N. D., Dharangoon.—For trade mark registration write to Messrs. P. Lodge & Co., Post Box 6772, Calcutta.

2708 F. B., Secunderabad.—For turmeric write to Jogindra Nath Das Co., 63, Ezra Street and Moran & Co., 4, Mangoe Lane; both of Calcutta.

2709 M. S. C., Chitarpur.—Surveying instruments may be bought of Thacker Spink & Co., 3, Esplanade East, Calcutta. For Civil List write to Central Book Depot, 8, Hastings St., Calcutta. For glass bracelets enquire of E. P. Nalladaroo & Co., 50/1, Canning Street, Calcutta.

2710 C. B. D., Nadiad.—For particular of permanent hair destroyer write direct to the advertiser.

2711 C. I. H., Sholapur.—To communicate with any querist write with same and number under care of **Industry** when your letter will be duly redirected.

2712 M. P. J., Allahabad.—Sour lime is 'lak lebu'; realgar is 'manashila' and molasses are 'gurh'.

2714 R. L., Nasirabad.—For removing pimples take ammonium chloride 60 grs., spring water 3 drs. Apply two or three times a day with a sponge. A recipe of soda water appeared in April 1925 issue. You may wash silk and woolen cloths in soapnut solution. Your letters were duly redirected to the parties concerned. It is not possible to neutralise the saline taste of pulse prepared. However, you may add some tamarind to the pulse by which the saline taste may be neutralised to a certain extent.

2715 J. N. G., Dibrugarh.—A good recipe of laundry soap appears elsewhere in this issue. Caustic soda, caustic potash, etc., chemicals may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta; Bengal Chemical & Pharmaceutical Works Ltd, 15, College Sqr., and Calcutta Chemical Co., 35/1, Panditia Road, Ballygunge, Calcutta. Soapstone may be bought of Jagadish Agarwalla, 80/1, Grey Street, Calcutta. You may

consult Soaps by George H. Hurst to be had of Chackraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta. Can supply elephant bone in very large quantities.

2719 J. M., Nasirabad.—Waste paper is stocked by The London Waste Paper Co. Ltd., King's Arms Wharf, London S. E. and Alexander Jacob & Co., Eagle Wharf, Hill Street, Peckham, London S. E. 15.

2720 R. B. C., Bombay.—The following are some of the piece-goods merchants of Katmandu, Nepal: (1) Amir Kurba Daki Brijlal Chiranjilal, Indra Chowk; (2) Asharam Chethuram, Makhan and (3) Baldevdas Ganpatrai, Indra Chowk.

2721 H. N., Saharanpur.—We do not review catalogues.

2722 T. H. B., Chipri.—Process of preparing washing soda appeared in July 1924 issue. Process of preparing menthol will be found in December 1921 issue.

2723 S. A. J., Taungdwingyi.—Platinum may be supplied by Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta.

2724 R. K. S., Benares.—A formula of transparent soap will be found in April 1921 issue. There is no substitute for alcohol.

2725 M. N. D., Calcutta.—Your queries have already been replied.

2727 H. H. R., Lucknow.—Cotton silk and woollen piece-goods are imported by Khan & Khan, 5, Clive Ghat Street, Shimwell Bros., Ltd., 57, Radha Bazar Street; Lachminarain Hazarimull, 203/1, Harrison Rd., Kerr Taruck & Co., 11, Clive Street and R. K. Dutt & Sons, 125, Old China Bazar Street; all of Calcutta.

2729 V. N. K. A., Nellikal Edam.—For books on rubber cultivation write to Director of Agriculture, Madras.

2732 R. D., Mailong.—Envelope making machines may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

2736 P. G., Calcutta.—For Indian curios enquire of The Oriental Stores, Stall 119, 120 and 121, Hogg Market, Calcutta. It is not advisable to invest money in foreign government securities. Refer your other query to the Director of Commercial Intelligence, 1, Council House Street, Calcutta.

2739 N. M. A., Calcutta.—The unit of coin in Holland is Gulden of 100 cents. As regards particular quotation it is very difficult to say which currency it refers to without going through the original letter. C. I. F. Quotation includes cost, insurance and freight. Your other queries being more of commercial than industrial importance should be not be published in the columns of **Industry**. You better try **Commercial India**, the sister journal of **Industry**. For commercial books on banking and currency enquire of Kamala Book Depot Ltd., 15, College Square, Calcutta.

2741 L. A. K., Ratnagiri.—Consult a physician. There is no such ointment known to us.

2742 S. L. R., Ludhiana.—You may consult English-Urdu Chemical Glossary by Mr. Gianchand Hotchand, P. O. Bhiria, Sind.

2743 B. N. B., Chittoor.—Gut is prepared from the intestines of sheep and hogs and are used for various purposes. Sheep's small intestine measures 25 to 30 yds and the hog's about 20 yds. The guts as received from the butchers are to be scraped but prior to this the contents of the gut are to be got rid of. The guts are thrown in a tub of water and the contents are pressed along the cavity. The guts are then scraped with a wedge-shaped piece of wood and sometimes with the back of a knife. By this process all the interior softer parts are detached, a little of the muscular layer being alone left. The guts are again thrown into water and then dried for the market.

2744 M. S. T. C., Srinagar.—You may refer your query to the Principal, Government College of Commerce, Bombay.

2745 M. K. P., Bhanvad.—Recipes for silvering glass appeared in December 1925 issue.

2747 H. T. A., Lashkar.—The recipes for the sweetmeats you mention may be best gathered from local confectioners.

2748 B. M. C., Dacca.—You may go through Soap Manufacture by George Hurst to be had of Chackrabarty Chatterjee & Co., 15 College Square, Calcutta.

2750 G. P. P., Jharsuguda.—Borax is prepared in large quantity by the addition of sodium carbonate to the hot solution of boric acid; the liquid on cooling deposits this salt in large colourless crystals.

2751 S. C. B., Poona.—Mail Order Business is a form of order supplying business mainly based on commercial letters and circulars. German fancy goods may be bought of Singh Sarkar & Co., 125 Harrison Road, Calcutta.

2752 J. I. W., Tirthahali.—Spermaceti may be bought of B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta. Tallow may be supplied by Calcutta Tallow Mart, 19 Tirettra Bazar Street, Calcutta. Candle making apparatuses may be had of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta. For candles, stationery goods and novelties go through the advertising pages of **Industry**. For metal dies write to Calcutta Industries Ltd., 136-37 Manick-tola Main Road, Calcutta. Sheet metal machi-

SERVICEABLE GOODS.

High Class Ready Made Swadeshi Clothes.

Madras Tassar Coat Rs. 4/- and Rs. 3/-
Suit Rs. 7/8 and Rs. 5/4; Twill Shirts Rs. 1/8;
Jaffer Shirts Rs. 1/6; Warm Frocks As. -12/-
with order. We defy competition in Prices
and Artistic Cutting.

MAHINDRAKAR BROS.,
Bombay No. 4 or 12 & Poona City.

neries may be supplied by Taylor & Challen Ltd., Birmingham, England.

2753 S. N. C., Meerut.—Recipes of hectograph appeared in June 1924 issue.

2754 R. N. S., Calcutta.—Reply of your queries appeared in the last issue under No. 2387.

2755 S. M. C., Badlipar.—Scarlet dye is a kind of aniline dye the manufacture of which involves many technicalities.

2757 K. S. Burdwan.—Wants to be introduced to importers and dealers in elephant brand and other brand old unread newspapers and exporters of the same in England.

2758 S. K. M., Bombay.—For law books enquire of R. C. Cambray & Co, 15 College Square, Calcutta. You may consult Wide-World English Correspondence by Mr K. M. Banerjee to be had of Industry Book Dept, 22, Sham Bazar Bridge Road, Shambazar, Calcutta.

2760 P. S., Calingapatam.—Take salt 40 oz wax 40 oz; sesame oil 40 oz. Melt in a water bath and under assiduous stirring, so as to make a foamy mixture; add castor oil 21 oz. tragacanth mucilage 20 oz. The last ingredient must be a thick preparation, made with rose water. The product will be a good kind of brilliantine.

2761 M. C. P., Bassein.—Shellac may be bought of Moran & Co, Mangoe Lane, Calcutta. Recipes of enamel paint appeared in August, 1924 issue. Formulas of spirit varnish will be found in November 1923 issue. Fancy goods may be supplied by Kahain & Co, G m b. H., Schoneberg, Hauptstrasse 49, Berlin, Germany; Birmingham. Novelty Co. Ltd, 28 Edgbaston Street, Birmingham, England; Pacific Novelty Co, 41 E, 11th, Street New York, U. S. A; Adachi T N Kaisha, 43 Nishimachi, Kobe, Japan and Brull & Drug Nori Sad, Vojvodina, Czechoslovakia. For more addresses go through the Directory of Reference column of the January 1926 issue of **Commercial India**, the sister journal of **Industry**.

2765 D. D. T. F., Lansdowne.—Paper cutting machines may be bought of Ashutosh Addy & Co, 16 Lower Chitpore Road, and John Dickinson & Co., Mercantile Bldg, Bentinck Street; both of Calcutta. Paper stitching machines may also be had of the above firms. Stationery goods may be supplied by Dass & Co., 60 Sikdar Bagan Street and Nilmoney Halder & Co., 106, Radha Bazar Street; both of Calcutta.

2766 B. D. B., Rawalpindi.—You may go through **Commercial Bulletin**. P. O. Box 990, Jerusalem, Palestine.

2767 J. D. Ghoramara.—An article on boot polish manufacture appeared in June 1923 issue of **Industry**.

2768 (a) K. A. N. Madura.—It is not possible perhaps to print mica sheets as is done in ordinary printing. You may however try stencilling with water colour as in the case of glass. It is very difficult to ascertain the composition

of an article on seeing it without chemical analysis. You may try Dr. B. N. Ghose, 6 Cooper's Lane, Calcutta for analysis.

2768 (b) R. K. D., Amerali.—A good recipe of pain balm appeared in the last issue. Recipes of **tilak** will be found in December 1925 issue. Process of preparing dry cell and battery appeared in November, 1925 issue. Your other enquiries are unintelligible.

2769 H. W., Bombay.—If you go through Sale and Exchange pages of **Industry** you will find addresses of firms desirous of working as commission agents or manufacturer's representatives.

2770 G. G. A., Goa.—For starting business with small capital go through the New Idea, Columns of **Industry** where you will find many suggestions.

2771 J. K. D., Chittagong.—To obtain good flavour of ghee boil the ghee with some lemon leaves. For colour you may add a little quantity of turmeric.

2772 P. S. C., Dindigul.—Perfumes may be supplied by Burgoyne Burbidges & Co. Ltd., High Street East Ham, London E. C., Schimmel & Co., Wiltitz bei Leipzig, Germany and Heine & Co., A-G, Leipzig, U. Groba, Germany.

2773 V. G. C., Behampore.—Picture frames may be bought of Fotie Lall Seal & Sons, 10 Swallow Lane; and Hem Chunder Chunder, 13 Swallow Lane; both of Calcutta. Sulphur may be bought of Dina Nath Daw & Dabendra Nath Daw, 2 Banstala Street, Bara Bazar, Calcutta.

2775 S. A. R., Secunderabad.—For particular of wool **gabba** write direct to the advertiser. Gas filling apparatuses may be supplied by A. R. Khan & Son, Chanda, C. P.

2776 M. D. B., Mhow.—Formula of good bar soap will be found in August 1921 issue. For soap making you may consult Soap Manufacture by George Hurst.

2778 M. R. R. I., Salem.—Dyeing recipes appeared in August and September, 1925 issues of **Industry**. Take white wax 1 oz.; Spermaceti 1 oz; Patrolatum 4 oz. Melt, pour into a mortar which has been heated by being immersed some time in boiling water. Very gradually add 3 ounces of rose water and 1 oz of witch hazel, and assiduously stir the mixture until an emulsion is formed and afterwards until the mixture is nearly cold. The product will be a good quality snow cream.

FOR THE COLD SEASON.

Woolen Danigol & Snuff and Navy Blue Colours Over Coat Rs. 12/8; Sporting Coat Rs. 9, Serge Coat Rs. 9/8, Cloth—Swadeshi. Finally Superior. Goods are smart looking serviceable and cheap. ‡ with order.

• **MAHINDRAKAR BROS.,**

Bombay No. 4, or 12, & Poona City.

2779 H. N. R., Nagercoil.—Tamil equivalents of embelic myrobalans are **nellikai, toppi, nelli**. Tamil equivalents of belleric myrobalans are **tani, thani, kattu elupay, tanrik-kay, tandi tona, chattu-elupa, etc.** The following makes a good serviceable black ink on macerating the powder in 100 times its weight of rain or distilled water for a few days. Powdered gallnuts, 10 parts; gum arabic, 8 parts; cloves, 1 part and iron sulphate, 10 parts. Put into an earthen ware or glass vessel, cover with 100 times of distilled water and set aside for 10 days. Decant and bottle for use. For making rubber stamp ink take two parts of any oil soluble aniline dye and three of crude oleic acid. Then pour down the mixture with about 50 parts of castor oil. The proportion of the last ingredient may be increased or decreased according to the shade of the colour desired.

2780 S. C. D., Silchar.—Books on weaving both in English and in Bengali may be had of Bros Partner & Co, 35 Ezra Street, Calcutta.

2781 M. M. B., Mory.—Wants to be put in touch with cashew nut exporters of Kenya Colony and cashew nut kernel and palm kernel importers of Canada, U. S. A. and England.

2782 T. K. P., Pollachi.—Packing paper and cardboards may be supplied by Ghosh Bros 63 J. Radhabazar Street, Calcutta. Chemicals may be bought of B. K. Paul & Co, 1-3 Bonfields Lane, Calcutta. For hurricane lanterns write to Elliot & Co, 6A, Clive Row, Calcutta. Other lanterns may be had of Sarat Chandra Dass, 194 Old China Bazar Street, Calcutta.

2783 T. S. R. N., Masulipatam.—Refer your query to the Principal Astanga Ayurveda Vidyalaya, 75 Raja Dinendra Street, Calcutta.

2784 B. L., Dacca.—Preparation of artificial indigo is very costly and it is not possible on a small scale. An article on incandescent gas mantle appeared in February 1922 issue. As regards concrete refer your enquiry to an engineer. For removing ink stains try with lemon juice.

2785 B. D. S., Agra.—For fruit juice extracting presses write to Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

2786 K. L. D., Bombay.—Wash your yarn with caustic soda solution.

2789 J. S. L., Darjeeling.—Paddy milling machineries may be supplied by Marshall Sons & Co. Ltd, 99 Clive Street, Calcutta.

2790 H. P. L., Secunderabad.—Plaster of Paris may be supplied by B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta and Calcutta Mineral Supply Agency, 31 Jackson Lane, Calcutta.

2791 H. T. N. I., Hindupur.—For distilling apparatus enquire of Bengal Scientific Supplies Co., 29 College Street Market, Calcutta.

2792 B. H. S., Bangalore.—For information regarding Japan you may refer to The Imperial

Commercial Museum, The Department of State for Agriculture and Commerce, Tokyo, Japan. The following journals will serve your purpose. Japan Salesman, 51 Yama Shitacho, Yokohama, Japan; Export and Import Review, 38-39 Krausenstrasse, Berlin, Germany; Ubersee Post, 10 Solomonstrasse, Leipzig, Germany & Swiss Exporter, Chamber of Commerce, Berne, Switzerland. Watch glasses may be supplied by Japan Watch Glass Manufacturing Co, 8 Roku-chome, Kaigon-dori, Kobe and Konishi Kotadudo & Co, 1 Nakobeshi Izumi-cho, Kyobashiku, Tokyo; both of Japan. For spectacles lenses and frames enquire of G. F. W. Gabrich, Nikolaistrasse 11-13 Leipzig, Germany and Dr. Steable & Co G m. b. H, Lindurmstrasse, 88 Munich, Germany.

2794 G. R., Satna.—It is not possible to soften mother-of-pearl. For books on knitting write to Book Co., 4/4A, College Square, Calcutta.

2795 S. P. W., Kunta.—For securing good outdoor business for your firm advertise in local papers.

2796 A. L. T., Trichur.—For learning electrical and mechanical engineering you may try Bengal Engineering College, Shibpur, Howrah; Bengal Technical Institute, Jadavpur, 24 Parganas and Roorkee Engineering College, Roorkee, U. P.

2797 No name.—Newar making machines may be supplied by Oriental Machinery Supply Agency Ltd., 20/1 Lall Bazar Street, Calcutta. Home printer may be had of S. C. Dutt & B. K. Dutt, 100 Durga Charan Mitter Street, Calcutta. Cloth washing machines may be supplied by Pioneer Mail Supply Co, 93/3 Clive Street, Calcutta.

2798 D. N. M., Dadusiva.—Arrowroot, etc. may be bought of Jadu Nath Ghar, Hookaputty, Bara Bazar, Calcutta. For the book required write to Book Co, 4/4A, College Square, Calcutta.

2800 D. H. Hospet.—For mackintosh enquire of Allen Bros. & Co., Ltd., 7 Hare Street, Calcutta.

2801 J. A. A., Bombay.—Recipes of hair lotion will be found in September, 1924 issue. An article on vaseline appeared in December 1921 issue. You may use naphthaline.

2802 M. M. C., Quetta.—An article on boot polish manufacture appeared in June 1923 issue. For vaseline refer to No. 2801 above.

2803 K. A. R., Penugonda.—Gas filling apparatuses may be bought of A. R. Khan & Sons, Chanda, C. P. It is not possible to buy a secondhand copy of Thacker's Directory at cheap price. You may however go through the Sale & Exchange pages of **Industry**.

2805 V. C., Jalawatulla.—For particulars regarding cane cultivation in Ceylon write to the Principal, Poona Agricultural College, Poona. It will not be advisable for you to cultivate bamboo for fencing paddy fields. According to expert opinion there is much fibre

in the flax grown in India, as in Manilla namely about 20 per cent. of dried straw. The average yield of retted and dried straw at Doorjah from sowing at the rate of 2 maunds of seed was 40 maunds per acre, and the percentage of fibre obtained from the straw was 16 per cent or 6 maunds of fibre per acre. Indigo is largely exported to Germany, America and Great Britain.

2811 R. V., Pulankutichi.—For building materials enquire of Martin & Co, Clive Street, Calcutta and Burn & Co, Hongkong House, Council House St, Calcutta. Pains of various descriptions may be supplied by Bengal Paint & Varnish Works Ltd, 24 Strand Road, and J. C. Coomar & Sons, 25-26 Clive Street; both of Calcutta. Books on engineering and industrial subjects may be bought of Chatterjee & Co, Ltd, 15 College Square, Calcutta.

2812 N R W, Akyab.—The chemicals you require may be bought of D. Waldie & Co, 1 British Indian Street and B. K. Paul & Co, 1-3 Bonfields Lane; both of Calcutta. For industrial books enquire of Book Co, 4/A, College Square and Thacker Spink & Co, 3 Esplanade East, Calcutta.

2813 G N R B, Guindyattam.—Thread balls are imported by Patuck Sons & Co, Bake House Lane, Fort Bombay; Gokulchand Ramchand Lakhichautra, Benares City and Keriawalla Bros, Sadar Bazar, Delhi. Wants to be put in touch with agents of German Gritzner sewing machines in India.

2814 B S D, Salkia.—All particulars regarding match industry will be found in July 1922 and September 1923 issue of **Industry**.

2815 C. L. T, Bangalore City.—Consult a physician.

2817 S S B. G O, Hooghly.—Add 1 dram rectified spirit to 24 oz "pachan" to preserve it.

2818 B. C, Rewari.—Wants all sorts of telegraphic appliances such as dummies, etc. For books on European astrology, shorthand etc. enquire of Thacker & Spink & Co, Esplanade, Calcutta.

2819 P S, Walayapet.—Reply to your queries appeared in December 1925 issue under No. 2272.

2821 M B, Mirpur.—For starting small prospective industries go through the September 1923 issue of **Industry** wherein you will find some useful suggestions.

2823 D. V. S G, Kurnool.—Electrical novelties may be supplied by Elektrolampe Methner & Muhlmann, Dirksenstrasse, 45, Berlin and Elektro-Zentrum G. m. b. H., Burgstrasse 28, Berlin; both of Germany. Assafetida may be bought of Asram & Sons Ludhiana and S. S. Batheja & Co., Quetta. Tin boxes may be supplied by Higashidani & Co., 17 Ichome, Kitalborie, Kamidori, Nishi-ku-Osaka and Kiyosu Shoten, Tsukishima, Kyobashi-ku, Tokyo; both of Japan. Glasswares may be supplied by Alfred Ebrilich, Gablonz, Jablone, Czechoslovakia and Lukes & Co, G. m. b. H.,

Nusle 508 Prag, Praha, Czechoslovakia. Wants to be introduced to pygona lac suppliers of Rangoon.

2828 A. U., No address.—Desires to buy hookah in large quantity.

2832 H. T. S, Bombay.—We cannot evidently advise you.

2834 N M S, Nathdwara.—For collapsible tubes enquire of Venesta Ltd, 4, Mangoe Lane, Calcutta and B. K. Paul & Co, 1-3, Bonfields Lane, Calcutta.

2835 C. B S, Partabgarh.—Wants agency of "Kirana".

2836 M D H, Alwar State.—Process of preparing yeast will appear in an early issue. Process of silvering mirror appeared in December, 1925 issue.

2838 N D, Meerut.—Cardboard boxes are manufactured by H. L. Sett & Sons, 8, Nihonney, Mitter Street, Calcutta; Cardboard Box Manufacturing Co, 64/1, Mechua Bazar Street, Calcutta, Kundu Dass, 20, Gour Laha Street, Calcutta and L. B. Verma, Cawnpore.

2839 M S, Kullu.—Amla oil is a special preparation of oil in which amla forms one of the ingredients. Process of preparing this oil will appear in an early issue. Stamp collection is more or less a hobby but sometimes it pays handsomely. Rare stamps often fetch good price. Harrison knitting machines may be supplied by Economic Mills Ltd, 50/2, Dharamtala Street, Calcutta. Your other queries being in the nature of an advertisement should not be published in these columns.

2844 V S R, Vizianagram.—For rose plants write to Nurjehan Nursery, Kankurgachi Lane, Manicktala Main Road, Calcutta.

2845 H. P, Jhansi.—Silk yarn may be supplied by Jotindra Mohan Paul & Brajendra Mohan Paul 192, Cross Street, Calcutta and K. Haridas & Co, 30-36, Parsi Bazar Street, Fort, Bombay.

2847 D. R P, Tiruthurapundi.—Recipes of agarbatties appeared in May 1924 issue. Perfumeries may be supplied by P. L. Bockairy, 16 r de l'Ecliquier; J. Gerin, 51 r Victor-Hugo, Bagnolet; Klotz C & Co, H u G; 18 pl. Vendome all of Paris, France and Daruma Shokai Ltd, 3, Chome Tosabori, Nishiku, Osaka, Japan and T. Aruga & Co, 17, Nichome, Yokohama-cho, Nihonba-shi-ku Tokyo, Japan. There is perhaps some defect in manufacturing processes. Your other query is unintelligible.

2848 N C F, Nagpur.—In pencil manufacturing you should use soft wood whereby you need not require to soften wood by artificial means.

2849 V. K. R, Mysore.—Requires paper bag in large quantities.

2849 (a) A S G, Mijar.—An article on horticulture and grafting appeared in October 1925 issue.

2850 B. S. D, Cuttack.—For patent registration write to P. Lodge & Co, Po. 6772, Calcutta. Various kinds of charkas have been invented and put in the market. Charkas may

be bought of Bengal Industries Co., 11, Gour Mohan Mukherjee Street, Calcutta; Bharat Silpa Bhawan, 20, Cornwallis Street, Calcutta and Ashutosh Roy & Co., 235/2, Bow Bazar Street, Calcutta.

2852 B. R. K., Aligarh.—The breaking of the container of the "sarbat" manufactured by you is due to fermentation which may be rectified by adding a few drops of rectified spirit to the sarbat. For detailed information you are referred to the book Syrup Manufacture published from this office.

2854 S. S. R. V., Mysore.—Tablet making machines may be supplied by Komprimier-Maschinen Gessells Chaft, Gnuisenaustasse 67, Berlin S. O. 1, Germany and Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta. Other machines you require may be had of the latter firm.

2856 J. J. G., Trichinopoly.—Your query is unintelligible.

2858 W. P. C., Rangoon.—Recipes of pain balm will be found in October 1921 issue of **Industry** which will be sent to on receipt of 5 as. postal stamp.

2859 S. D., Calcutta.—Recipes of snuff appeared in November 1924 issue.

2864 N. M., Castle Rock.—Scatter caustic soda on the ground. Process of preparing cyclostyle will appear in an early issue.

2865 M. L. B., Bundi.—Washing soda or soda ash is the impure form of soda crystal.

2866 B. Y., Bilaspur.—There is perhaps no arrangement for learning soap and candle manufacture. It is advisable for you to be an apprentice in a soap factory or in a candle factory. You may go through Soap Manufacture by George Hurst to be had of Book Co., 4/4A, College Square, Calcutta. The apparatuses for soap manufacture may be supplied by Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta.

2868 A. T., Delhi.—Cultured pearls are imported by Goonamal Pursram, 21, Park St., and Lakhiraj Shewakram & Co., 21A, Park Street, Calcutta.

BOMBAY DESHI OUSHADHALAYA

Factory & Dispensary.

ASK FOR ANY FEVER.

Ague Killer.

1 Phial As. 8.

Doz, Rs. 5.

and our other popular remedies.

Can be had everywhere at

• Cheapest Rate. •

PEARL & CO., Victoria Garden,

BOMBAY.

2869 A. O. H., Dacca.—Refer your query to the Superintendent of Government Printing, Nizam's Dominion, Hyderabad.

2870 L. C. B., Gujjar Khan.—Gold chains may be prepared by N. Gupta & Sons, 5, Gupta's Lane, Calcutta; B. K. Damani, 401/7, Upper Chitpur Road, Calcutta and Sarkar Bros, 168, Bow Bazar Street, Calcutta. As regards foreign addresses the following firms may be recommended: (1) Bassett Jewellery Co, Providence, Rhode Island; Conjoint Jewelry Corps, New York and Goldsmith Stern & Co, New York; all of U. S. A. There is no jewellery school known to us.

2874 M. H. R., Masulipatam.—For tablet making machine refer to No. 2854 above.

2875 M. V. J. N., Madras.—Whiting is another name for ground chalk. It is available at any paint shop. Printed tin boxes may be supplied by Calcutta Colour Printing Works, Post Box 6772, Calcutta.

2877 C. R., Vizianagram.—Plants and seeds may be bought of Nurjehan Nursery, Kankurgachi Lane, Manicktala Main Road, Calcutta.

2878 B. L. S., Lahore.—No other process of making vinegar essence is known to us. Making mustard oil colourless and odourless does not fall within the scope of the booklet Manufacture of Hair Oils.

2880 S. E., Bombay.—Match machines may be bought of Bhawani Engineering & Trading Co, 122/1, Circular Road and Bengal Small Industries Co, 91, Durga Charan Mitter Street; both of Calcutta. For estimate of starting a match factory please go through September 1924 issue of **Industry**. All information regarding match industry will be found in July 1922 issue. Your other queries refer to business organisation and salesmanship which form the subject matter of **Commercial India**, the sister journal of **Industry**.

2882 G. N. D. P. W., Russellkonda.—Your previous letter is not traceable. For naphthal colour please try Aminchand Mehra & Sons, 3, Armenian Street, Calcutta. Chemicals may be bought of B. K. Paul & Co, 1-3, Bonfields Lane, Calcutta.

2884 C. C., Surat.—Tea and coffee may be bought of Lipton Ltd, 33, Apollo Street, Bombay; J. E. Mody & Sons, 164, Hornby Road, Bombay; Bissonauth Law & Co., 1, Hastings Street, Calcutta; Bhattacharya & Co. Ltd., 1, Swallow Lane, Calcutta; Siddick Meanjee Sait & Sons, Commercial Road, Ootcamand and Bayley & Brook Ltd, Dennington P.O., Ootcamand.

2886 J. C. D., Dacca.—You may go through Pitman's Commercial Geography to be had of Kamala Book Depot Ltd, 15, College Square, Calcutta.

2888 M. G. A., Delhi.—Yeast is the English form of toddy. In place of yeast you may use toddy. Recipes of pain balm appeared in the last issue. For borrowing books you may write to the Librarian, Commercial Library, 1, Council House Street, Calcutta.

2889 S. S. G. S., Bezwada.—Sporting goods may be bought of S. Roy & Co., Esplanade East, Calcutta; Carr & Mohalanobis, Chowringhee Corner, Calcutta; Bombay Sports Depot, Dhobi Talao, Bombay and Gujrat Sports Supply Co., Pragmahal, Dhobi Talao, Bombay; The above firms may also supply the sticks required.

2890 K. C. L., Khurda.—Yes, you may manage the business started by your father after his death. If the article previously manufactured be not registered you may put your manufacture in the market under the same trade name.

2891 J. M. B., Gadhra.—Glues are manufactured by M. P. Gupta, Cawnpore. For supplying papain milk you may communicate with Bengal Chemical & Pharmaceutical Works Ltd, 15, College Square, Calcutta. For books on tanning write to Book Co., 4/4A, College Square, Calcutta.

2892 D. K. D. B., Sirsi.—The following preparation may be used for dressing all kinds of fabrics. Take 76 parts of water, 16 of potato starch, and 8 of caustic lye of 25 degree B; pour the starch into the water and then add the lye, stirring constantly. The fluid clarifies suddenly, and gives a thick gelatine, which must be vigorously beaten. If dried in thin leaves it forms a hornlike substance, which can be folded together without breaking.

2893 V. I. M., Bllimora.—For the machine required write to the Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta. Formulas of paint appeared in August 1924 issue.

2894 K. H. S., Bikaner.—To communicate with any querist write him with name and number under care of **Industry** when your letters will be duly redirected. Wants to be put in touch with suppliers of blood stone.

2895 D. K. E., Khandesh.—For books on engineering enquire of Book Co., 4/4A, College Square and Thacker Spink & Co., 3, Esplanade East; both of Calcutta.

2897 K. S. H. A., Chalapuram.—In preparing artificial butter milk first prepare butter-milk powder as follows: Sodium chloride 50 parts; milk sugar 100 parts; Potassium nitrate 5 parts; alum 5 parts. Mix. Now take butter-milk powder 10 parts; vinegar 1 part; syrup of buck-thorn 1 part. Dissolve the powder in the water and add the vinegar and syrup. This will yield artificial butter-milk.

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K. M. DAS & CO.,

29-1, Telepara, Sampooker St., Calcutta.

2898 S. P. D. S., Quetta.—Formula of bar soap resembling sunlight soap appeared in July 1921 issue of **Industry**.

2899 D. N. K., Amraoti.—For telegraph dummy write to James Murray & Co., 16, Old Court House Street, Calcutta.

2900 I. T. C., Cocanada.—Hosiery goods may be supplied by E. B. Bros & Co., 11, Dharamtala Street, Calcutta.

2902 S. A. G., Rangoon.—Gut is exported by M. A. Sarwar & Bros, Sialkot; Ad. Meyer, 5, South Tangra Road, Entally, Calcutta; Gulam Mohamed Puri, Sialkot City; Alliance Trading Co., Karimpura, Sialkot City and Mohamed Shafi & Bros, Misnapura, Sialkot City.

2904 M. A. R. M., Noakhali.—Razors are imported by Kareem Mohamed Abdul Khader & Co., 20, Tiretta Bazar Street, and S. A. Khalique & Co., 1, Colootola Street; both of Calcutta. Boot polishes may be bought of Chandra Bros, Bentinck Street, Calcutta. Locks may be supplied by Dinshaw Mehta & Co., 11, Hare Street, Calcutta and Satish Ch. Chatterjee, 113, Monohar Dass Chowk, Bara Bazar, Calcutta. Matches may be bought of H. Rashid & Co., 15, Zakariah Street and B. M. Start & Co., 133, Canning Street; both of Calcutta.

2905 A. L. C. D., Banosa.—Envelope making machines may be bought of Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta.

2906 V. S. D., Multan.—You may write to the Secretary, The Association for the Advancement of Scientific Studies of Indian Students in Foreign Countries, 10, Old Post Office Street, Calcutta for help.

2908 R. R. I., Rawalpindi.—It is very difficult on our part to say which business will suit you best. As success in business depends no less on individual choice. It is therefore advisable for you to go through September, 1923 and December 1925 issues of **Industry**, where you will find some suggestions for starting prospective industries. Then you may pick out some ideas from them and refer those to us for their comparative merits and demerits when we shall try to solve your doubts and difficulties.

2910 J. T. C., Cocanada.—Petrol lamps may be bought of Ahmuty & Co., 6 Church Lane, and K. C. Dey & Sons, 124 Harrison Road; both of Calcutta. Toys may be supplied by K. B. Nan, 233 Old China Bazar Street and Pioneer Toy Mart, 234 Old China Bazar Street; both of Calcutta. Toilet articles may be had of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

2911 B. N. B., Chittoor.—Process of preparing gut appeared in June 1922 issue.

2912 M. R. B. S., Bhera.—Ginger is mainly exported from Bombay, Madras, Bengal and Bihar and Orissa. Ginger may be bought of K. Haridas & Co., 30-36 Parsi Bazar Street, Fort, Bombay; Bansidhar Dutt, 126 Khengraputty, Bara Bazar, Calcutta; Abdul Haq Ahmed,

48 Anderson Street, Madras and Ebrahim Mohamed Suraiyah, Shanliaganj, Cuttack. All the other spices you require may be supplied by the above firms. In the beginning you may invest Rs. 3000 for starting a commission agency business. Method of opening commission houses appeared in February 1926 issue of **Commercial India**. Chemicals are manufactured by W. Tenschler & Co., Kommandit-Gesellschaft, Leipzig, Germany. No address of any association in Argentine Republic is known to us. Wants to be put in touch with suppliers of pepper, dried and bleached ginger, cardamom, cloves and turmeric.

2913 M. D. H., Raichur - Sesame and groundnut oils may be bought of Anath Nath De, 4 Moidaputty Bara Bazar, Calcutta. Formulas of soap will be found in the December 1925 issue of **Industry**. For industrial books enquire of Book Co., 44A, College Square, Calcutta. Other recipes you require appeared several times in **Industry**.

2914 P. N. C., Uppatur - For butter enquire of Hafiz Wazir Mohamed, 6 New Market, Calcutta.

2915 R. G. J., Nowgong - You may use either sandal oil or benzoin as fixing agents. Burn incense or sulphur when flies will fly away.

2916 T. S. R., Bangalore City - Recipes of ink powder appeared in September 1921 issue.

2917 J. K. D., Chittagong - Wants to be put in touch with dealers in ghee, cardamom, leather, ginger, tobacco and wool. Corrugated tin sheets may be supplied by Grohmann & Frosch, Leipzig, Plag W. Weissenfellerstrasse 65 Germany and Weith Nfg. C. F. Nonnenmuhl 12, Leipzig, Germany. Cutlery goods may be supplied by T. A. Nippel Wald Solingen; Max Reul, Solingen II and Wester & Co., Haan-Solingen; all of Germany. Stationery goods may be supplied by Leo Stubenreich & Co., Nurnberg; Rudolf Stein, Nurnberg 11 and Mumm & Zaun Nachf., Berlin N 4; all of Germany.

2919 G. P. M., Bara Banki - Novelties you require may be bought of our advertisers Mahomedbhoy Jivabhoy & Co., Nizam Street, Bombay 9; Indo-German Trading Co., Cocanada Ram Bros, 883/45 Burns Road, Karachi; S. C. Seal, 136 Upper Chitpur Road, Calcutta; K. S. Maniar, 55/1, Canning Street, Calcutta and the Union Trading Co., 166 Harrison Road, Calcutta.

2920 D. F., Goa - Answer to your queries appear in this issue under No. 2702.

2922 G. G. A., Goa - For starting business with small capital go through New Idea columns of **Industry**. Imitation pearls and jewellery may be bought of M. Allabux & Co., Narsingha Mansion, Carnac Road; Gulab Chand Devchand, 46-48 Meadows Street, Fort and Hormasjee & Co., 225-227 Hornby Road, Fort; all of Bombay. Cardboard boxes are manufactured by G. Mahadeo & Co., Sandhurst Road and Card-board Manufacturing Co., Angreswadi; both of Bombay.

2924 S. M., Mergui - Rubber goods are manufactured by Birmingham Motor Accessories Co., 218 Corporation Street, Birmingham; Greengate & Irewell Rubber Co., Ltd., Greengate Works, Salford, England; Continental Rubber Works, Pennsylvania, U. S. A.; Sachsland Gummiwarenfabrik, Bielefeld Thuringen, Germany and Wolff & Co., Nurnberg, Germany.

2927 D. M. M., Jamnagar - Sarees may be bought of Dhanalakshmi Swadeshi Cloth Stores 19 Anuman Sannadhi Street; Kassim Jamal Sait, Anuman Sannadhi Street and N. M. Rayaloo Iyer & Co., Soth Masi Street; all of Madura. Colours are manufactured by Reinhold Flugger & Boecking Hansburg 35, Griessdorf & Rabe G. m. b. H., Reichenbach 3 6/L and Ludwig Ellerhusen, G. m. b. H., Hamburg 24; all of Germany. Laces are manufactured by Otto Heinig, Plauen Vogt and Albert Troger, Elterlein, sa; both of Germany.

2928 J. D., Kishorganj - We thankfully decline your service.

2930 M. S., Tinnevely - Export Zeitung is a weekly published from Hamburg, Germany.

2931 N. D., Mahdi - Filtered til oil will be suitable for hair oil. Full process of filtering appeared in the booklet on Hair Oil Manufacture.

2936 S. C. A. J., Bangalore - Formula of fountain pen ink appeared in August 1925 issue. An article on distillation appeared in August 1925 issue. There must be some defect of ingredient or manipulation in the process of manufacture of fountain pen ink.

2937 C. S. M., Salem - Machines for extracting oils may be supplied by Burn & Co., Hongkong House, Council House Street; John King & Co., 93 Clive Street and T. E. Thomson & Co., 9 Esplanade East all of Calcutta. Ice making plants may be had of Burn & Co.

2938 J. M. N. K., Kaimganj - Oil engines may be supplied by John King & Co., Howrah; Worthington Simpson Ltd., 10, Clive Street, Calcutta; E. D. Sassoon & Co. Ltd., 100 Clive Street, Calcutta and Millars' Timber & Trading Co. Ltd.; Agents Gillanders Arbuthnot & Co., Gillanders House, Calcutta. Typewriters you require may be bought of Remington Typewriter Co., Council House Street, Calcutta.

2940 Q. C., Betul - Magic slates may be bought of Balkrishna Mohta & Co., 41 Khetra

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ORIGINAL HOMEOPHARMACISTS,

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Dealers in Original Homoeopathic dilutions and Biochemic Triturations.

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Mitter Lane, Salkia, Howrah; The Union Trading Co., 125 Muktaran Babu Street, Calcutta and T. Lackshminarayana Chettiar & Son, Lakshmi Vilas, Hospital Street, Tiruvadi Post Office, Tanjore Dist. Mufflers may be supplied by Cawnpore Woollen Mills Ltd., Cawnpore.

2941 R. L., Nasirabad.—Reply to your query appears in this issue under No. 2714

2943 S. C., Morar.—To communicate with any querist write him with name and number under case of **Industry** when your letter will be duly redirected. You may remit money to firms in Germany by buying British Postal Order. One renten mark equals 1 shilling; 100 dollars equal Rs. 273; 940 francs equal Rs. 100 and 100 cents equal 1 franc.

2944 H. G. A., Shikarpur.—Process of discharging colours appeared in January 1924 issue. An article on dyeing and bleaching appeared in May 1922 issue. For books on industrial subjects write to Book Co., 4/4A, College Square, Calcutta.

2945 M. D. S. M., Raichur.—Scents may be bought of Sickri & Co., 55/8 Canning Street and Paradise Perfumery House, 75 Colootola Street; both of Calcutta. Colours may be bought of Amin, Chand Mehra & Sons, 34 Armenian Street and Hansraj Vishram & Co., 13 David Joseph Lane; both of Calcutta.

2946 K. P. B., Lucknow.—Chemicals may be bought of Bengal Chemical and Pharmaceutical Works Ltd., 15 College Square; B. K. Paul & Co., 1-3 Bonfields Lane and D. Waldie & Co., 1 British Indian Street; all of Calcutta. Chemical apparatuses may be bought of Scientific Supplies Co., 29-30 College Street Market, Calcutta and Scientific Instrument Co. Ltd., Johnstonganj, Allahabad.

2947 A. P., Bombay.—You may insert your advertisement in Times of Natal, Pietermaritzburg, Natal and in Cape Time, Cape Town.

2948 V. V. P., Balaskur.—Buttons may be bought of East India Button Co., 34 Ganakuly,

Pilkhana, Dacca; Imperial Horn Works, Ashude & Co., Old Court House Corner, Calcutta and East Bengal Button Manufacture Co., 75 Lyall Street, Dacca.

2949 M. A. W., Nowgong.—For industrial books please enquire of Book Co. Ltd., 4/4A, College Square and Thacker Spink & Co., 3 Esplanade East; both of Calcutta. For preparing depilatory powder take barium sulphide, powdered quick lime and powdered starch in equal parts. To prevent bed bugs rub the joints of the bedstead with equal parts spirit of turpentine and kerosine oil, and where there are many cracks in the surface of the room. Filling up all the cracks with hard soap is a good remedy. A small amount of pennyroyal sprinkled around the room will drive away mosquitoes. For betelnuts enquire of Madhab Chandra Daw, 4 Armenian Street, Calcutta.

2950 K. P. P., Travancore.—Can supply eggs

2952 V. C. W., Nizamabad.—Chemicals may be bought of B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta. Gum sandarac may be had of Banshidhar Dutt & Sons, 126, Khengraputty, Bara Bazar, Calcutta. You may consult Zavenda Raad published from Ispahan; Sedarje Teheran published from Teheran; both of Persia. Wants to be introduced to dealers in Malacca canes.

2955 V. B., Bombay.—Sulphate of indigo may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

2956 R. L. M., Nasirabad.—It is not possible to turn brown shoes into black.

2958 V. W., Kulasekharapatnam.—Banian making machines may be bought of Economic Mills Ltd., 50/2 Dharamtala Street, Calcutta. Ribbon making machines may be supplied by Oriental Machinery Supply Agency Ltd., 20/1 Lall Bazar Street, Calcutta.

2959 L. L. J., Ghatkoper.—For list of weaving factories of all provinces enquire of Directors of Industries of various provinces.

2962 U. S. R. R., Udamalpet.—Secondhand books may be supplied by W. Heffer & Sons Ltd., Cambridge, England and W. & R. Chambers, 38 Soho Square, London, W. 1.

2965 P. C. S., Dogachi.—For disposing of ornaments advertise in the pages of Calcutta dailies. For a list of educational institutions of foreign countries enquire at Student's Advisory Board, 4 College Square, Calcutta. Wants a manager for supervising personal property of business in mofussil.

2967 C. P. S., Gujrat.—Picture post cards may be supplied by E. David, Cite Rougement 8 and W. Daunovetz, Ruede Lan 51; both of Paris, France. The following are some of the journals of Paris, France: Agriculture and Elevage; L'Exportateur Francais; L'Usine and La Nature.

2969 L. H. S., Malsiras.—For films enquire of J. F. Madan & Co., Tara Chand Dutt Street, Calcutta. Lamps for magic lantern may be



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3/D, Chowringhee, Calcutta,**

supplied by Calcutta Camera House, 158 Dharamtala Street and K. B. Nan, 233 Old China Bazar Street; both of Calcutta.

2970 N. C. S., Calcutta.—Electrical goods may be supplied by Elektrolampe Methner & Muhlmann, Dirksenstrasse 45, Berlin, Germany. Electro-Zentrum G. m. b. H. Burgstrasse 28, Berlin, Germany; S. Kato & Co., 19 Nichome, Utsubona Kadori Nishi-ku, Osaka, Japan and Oki Electric Co. Ltd., 2 Shichome, Mita, Tokyo. For more addresses go through the August 1925 issue of **Commercial India**, the sister journal of **Industry**.

2971 B. N. M., Arrah.—Press materials may be bought of Ashutosh Addya & Co., 16 Lower Chitpur Road, Calcutta. For Hindi types enquire of Gujrati Type Foundry, Gaiwadi, Girgaon, Bombay.

2972 P. B. B., Dacca.—For keeping the infusion fresh add a little quantity of 'rectified spirit'. For preparing 'arista' consult a Ayurvedic physician. For securing address advertise in the pages of newspapers and periodicals.

2973 M. R., Bombay.—An article on ink appeared in November 1922 issue. An article on boot polish manufacture appeared in June 1923 issue. Recipes of face cream appeared in July 1924 issue. Recipes of perfumeries will be found in September 1924 issue. For industrial books enquire of Book Co., 4/4A, College Square, Calcutta.

2974 M. B. O., Rangoon.—Burmese equivalent of Chebulic myrobalan is 'pangah'; that of embelic myrobalan is 'shabju,' 'tasha,' 'hziphyu,' 'ziphiyn-si,' that of belleric myrobalan is 'thitsein' and 'tissein.' Other equivalent is not available.

2975 U. V. L., Chalapuram.—Wants to be introduced to sole agent of Eagle Brand Kitchens Australian Borax Soap.

2976 L. R. M., Nasirabad.—For chemical analysis of mineral write to the Superintendent Government Testing House, Alipore, Calcutta. For selling mica advertise in the pages of newspapers and periodicals.

2977 U. S. B., Shillong.—Tobacco cutting machines may be indented by Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta on your behalf.

2978 R. A., Agra.—Saltpetre is used for all the purposes mentioned by you. Saltpetre may be supplied by Akhoy Kumar Dutt & Sons, 2 Banstala Street and Surendra Nath Daw & Sons, 3 Dayehatta Street; both of Calcutta.

2979 Chandra Vilas, 31 Brickfields Road, Kuala Lumpur, F. M. S.—Wants to be introduced to dealers in soapnut powder.

2980 B. C., Rewari.—Reply to your queries appears elsewhere in this issue under No. 2818.

2983 P. T. G., Karachi.—Lathes, drill, etc. may be bought of T. E. Thomson & Co., 9 Esplanade East, Calcutta. Furniture may be supplied by Adam Sajan & Co., 7 Bow Bazar Street, Chatterjee & Co., 30 Bow Bazar Street and Nundy & Bros., 249 Bow Bazar Street; all of Calcutta.

2984 P. L., Allahabad.—No such scheme has yet been invented by any scientist.

2985 B. R. D., Nagpur.—Kaolin may be bought of Williamson & Co., Daltonganj, Palamau and Calcutta Mineral Supply Agency, 31 Jackson Lane, Calcutta. For colour printed tin boxes write to Calcutta Colour Printing Works, Po. Box 6772, Calcutta. For your other query consult a physician.

2986 S. M. N., Monghyr.—For homeopathic books you may write to C. H. Medical College, 104 Cornwallis Street, Calcutta.

2987 O. P. V., Solan.—The electric stethoscope has not yet been put in the market. An article on rubber stamp making appeared in January 1924 issue.

2988 S. A., Tiruvadi.—For catalogues of glass bangles write to F. P. Nalladaroo & Co., 50/1 Canning Street, Calcutta.

2990 N. K. C., Kadiri.—Matches may be supplied by E. S. Abdul Kyam, 39 Issaji Street, Vadgadi, Bombay.

2991 N. D., Jodhpur.—Can supply wolfram ore in large quantities.

2992 K. P. L., Murtizapur.—An article on lithoprinting will appear in an early issue.

2993 S. C. D. P., Murshidabad.—For disposing of silk yarn correspond with G. Barbier, Rue de Caire 29 and Lanoe-Dibon Rue Aux Ours 17; both of Paris, France. Can supply silk yarn.

2994 B. K. L., Ramnagar.—You may consult Thacker's Indian Directory to be had of Thacker Spink & Co., 3 Esplanade East, Calcutta.

2995 S. S. B., Jhansi.—For industrial books enquire of Book Co., 4/4A, College Square, Calcutta.

2996 B. L. K., Pandharpur.—For lathes and machine tools enquire of T. E. Thomson & Co., 9 Esplanade East, Calcutta. Literature describing the working principle will also be supplied by the above firm.

2997 L. C., Gujar Khan.—Gold and silver articles are cast on dies which may be supplied by S. Paul, Bagh Bazar, Calcutta. For cutting precious stones enquire of Benode Behari Dutt & Sons, 1 Bepinck Street, Calcutta.

2998 H. C. S., Cuttack.—Iron safes may be bought of R. N. Mukherjee, 120 Sova Bazar Street and Dass & Co., 14 Cossipur Road; both of Calcutta.

2999 S. A. C., Shanmuganathapuram.—Jeweller's tools may be supplied by J. Basack & Co., 5 Old Court House Corner, Calcutta. Wants to be introduced to South Indian representative of F. Wolh & Son of Karlsruhe in Germany.

3000 P. C., Feroke.—Wants an expert for learning soap making.

3000(a) G. P. P., Jharsuguda.—Recipe of artificial camphor will be found in July 1923 issue. Artificial preparation of no other articles mentioned by you is possible. Soda water machines may be supplied by Little & Co., 3 Grants Lane, Calcutta.

3001 D. C. V., Ball Hongal.—Machine for drilling or boring rock for blasting purposes may be had of Alfred Herbert (India) Ltd., British Indian Street, Calcutta. For paper cutting machines please enquire of John Dickinson & Co., Mercantile Bldg., Calcutta.

3002 P. P. S., Alleppey.—For damp-proofing matches for glue please enquire of Bengal Scientific Supplies Co., College Street Market, Calcutta. Many good formulas for match composition have appeared from time to time in the pages of **Industry**.

3004 K. P. K., Poona.—Some addresses of picture calendars of foreign countries are given below: American Art Works, Coshocton, Ohio, U. S. A.; Henderson Lithographing Co Cincinnati, Ohio, U. S. A.; A. E. Sterl, Unt, Georgstrasse 5 Chemnitz, Germany; Adolf Forker Renditz, Senefelderstrasse 6, Leipzig, Germany and C. L. Keller, Brahdenburgstrasse, 43, Berlin, Germany. For registration of trade names please apply to P. Lodge & Co., Post Box 6772 Calcutta. For agencies of foreign manufacturers advertise in the page of **Commercial India**.

3005 R. K. D., Cawnpore.—Rice Starch is prepared by Seetarampore Starch Mfg Co, Seetarampore, E. I. Ry

3006 E. I. T. C., Kashmir.—A few trade journals of England, Holland and Japan are mentioned below: British Dominions Trade, 15 Bedford Street, London W.C2; The British Trade Review 113-117 Cavern Street, London E.C 4; De Courant, Amsterdam, Holland and Japan Salesman, 51 Yama Shitacho, Yokohama, Japan. The following shipping and forwarding agents may accept your consignments: Thomas Cook & Sons, 9 Old Court House Street, Calcutta, also of Cox's Bldgs., Hornby Road, Bombay.

3007 T. P. D. M., Triplicane.—Wants to be introduced to exporters of homeopathic and biochemic medicines. Cotton seed is exported by Anderson Wright & Co., 26 Strand Road, Calcutta.

3008 P. S., Quetta.—You may consult Calcutta Trade Directory issued by Thacker Spink & Co., 3 Esplanade East, Calcutta. Glassware and Crockery Importers are R. D. Dutta & Bros, 86-4 Harrison Road, Calcutta.

3011 F. C., Bezwada.—You can have the pearl cream analysed by Dr. B. N. Ghosh, 6 Cooper Lane, Calcutta.

3012 S. N. G., Poona.—Your article has already been noticed in January issue.

3013 L. R. S., Jullundur City.—The following is a list of cement manufacturers in India—Bundi Cement Co Ltd, Killick Bldgs. Home St.; Sudian Cement Co Ltd; Navsari Bldgs. Hornby Road, Katni Cement and Industrial Co., Ltd, 11 Esplanade; all of Bombay.

3014 G. M., Virudhunagar.—You can appoint agents in foreign countries for your wood work through the pages of **Commercial India**.

3015 B. M., Boparhat.—Coconut oil can be kept thin throughout the year by mixing with it a certain portion of til oil or mineral oil.

3016 G. D. K., Benares.—For sample cutting machine please enquire of Oriental Machinery Supply Agency, 201, Lall Bazar Street, Calcutta. Secondhand typewriters may be had of G. Rogers, Lall Bazar, Norton Bldgs., Calcutta

3017 R. & Co, Bombay.—It is difficult for us to select a brand for your soap. Try Sea foam, Eskined or Crane

3020 P. L. P., Rajkot.—The formula of ink quoted by you may yield good result. Commercial sulphuric acid may be used for the purpose. Ferrous sulphate is known in Hindi as 'Hirakas'

3021 B. D. S., Budanore.—You are referred to Calcutta Dental College and Hospital, 261 Bow Bazar Street, Calcutta

3023 K. P. Jalgaon.—You may learn every thing about soap making if you go through the series of articles on the subject that appeared in the 9th and 10th volumes.

3024 N. M., Burhanpur.—It would be advisable for you to consult a physician.

3029 B. R. R., Malabar.—Wants to sell used razor blades

3030 T. T., Kumbakonam.—Camphor powder may be compressed in the form of tablet with the help of the tablet making machine.

3031 P. O. H., Coimbatore.—The capital required for fruit growing will depend upon the scope of the business: the extent of ground and the varieties of fruits you intend to utilise. You would do well to consult the authorities of the local agricultural farm.

3032 I. F. N. S., Moga.—If you go through **Commercial India** regularly you will find all that you require to know about the exportable commodities of India.

3033 M. D. H., Adoni.—An article on the manufacture of Floral Oils is appearing in this issue.

3038 N. K., Verma.—We are not aware of any automatic bakery but you may enquire of the well known confectioners such as Great

Kaminia-Oil.

Used by all nations for preserving and beautifying the hair and keeping the head cool and brain refreshed. Rs. 1-4 per bottle.

(Registered)

TRY IT ONCE

SOLD EVERYWHERE.

Eastern Stores, Calcutta; Frederico Peliti, Old Court House Street, Calcutta.

3039 S. M. Z. U., Rawalpindi.—Wants to import Rubber crepe soles from U. S. A.

3040 R. S. L., Aligarh.—Magic lantern and bioscopes may be had of Calcutta Camera House, 159 Dharamtola Street, Calcutta

3041 P. S., Monghyr.—What is known as 'Bit laban' is obtained in the natural state. It is not prepared from rock salt as you suppose.

3044 S. P. W., Kurunegala.—Machinery for half-tone block making may be had of Engravers Machinery Co of Canada Ltd., Canada.

3045 L. R., Deshmukh.—Rice husking and thrashing mills may be had of Messrs. Marshall Sons & Co. Ltd., 99 Clive Street, Calcutta

3046 R. G., Nowgong.—Copper may be given an appearance of gold by electroplating.

3047 G. C., Lahore.—Tin boxes are manufactured by Cawnpore Hollow Wares Mfg. Co., La Touche Road, Cawnpore.

3048 K. S., Tinnevely.—Lead and tin are two quite different metallic elements

3050 P. E., Ollur.—Component parts of matches may be had of Bande Mataram Match Factory, Tollygunge, Calcutta. Match chemicals may be had of Oriental Industrial Co., College Street Market, Calcutta.

3051 S. B. S., Nadia.—Your queries being in the nature of an advertisement should not be published in these columns.

3052 A. B. C., Borhat.—For industrial books enquire of Book Co., 4/4A, College Square and Thacker Spink & Co., 3 Esplanade East; both of Calcutta.

3053 K. Y. M., Shikarpur.—Recipes of hair dye will be found in January 1925 issue

3054 M. A. F., Jherriah.—For vermicelli making machines enquire of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta and General Supplying Agency, Bhopal, C. I.

3056 R. D. C., Jammu.—You may learn automobile engineering at French Motor Car Co. Ltd., 234-3, Lower Circular Road Calcutta. For training in mechanical and electrical engineering you may try the various workshops of different railways or you may apply to the Principals, of Bengal Engineering College, Shibpur, Howrah and Bengal Technical Institute Jadavpur, 24 Parganas, Bengal.

3057 I. F. N. S., Moga.—The following is a list of trade information bureau as required by you. Indian News Service and Information Bureau, 27 Burgstrasse, Berlin C 2, Germany; Indo-Japanese Association, 3 It-chome, Yurakucho, Kojimachi-ku, Tokyo, Japan; Department of Commerce and Industry, Jerusalem, Palestine; The British Commercial News Association

21 Northumberland Avenue, London W. C. 2; American Bureau of Trade, Extension, Export-trade Bldg., Washington, D. C., U. S. A. and General Export Association, 8 Vasagatan, Sweden. The fancy goods and novelties you require may be bought of our advertisers Ram Bros, Burns Road, Karachi; K. G. Maniar, 55/1, Canning Street, Calcutta, Indo German Trading Co., Cocanada and R. Mediratta & Co., Lahore.

3058 P. C. S., Dogachi.—Refer your queries regarding joint stock companies to the Registrar, Joint Stock Co., Government Place, Calcutta. For prospectuses of different joint stock companies write direct to the firms.

3059 F. A. M., Malvan.—You may enquire direct of the firms if they have any agents in India.

3061 B. M. B., Jadhpyr.—Recipes of washing soap will be found in January 1926 issue of **Industry**. You should add adulterant in such a quantity so that quality is not marred considerably.

3062 I. F. N. S., Moga.—To dispose of raw articles mentioned by you advertise in the pages of newspapers and periodicals. Bicycles may be supplied by Gunl. and Harbeck, Normannenweg 24 Hamburg, Germany; Hermann Burr & Co., Karlstrasse 24, Karlsruhe, Germany; B. S. A. Cycles Ltd., 27 & 28, Pall Mall, London S. W. 1, and Maini Cycle and Manufacturing Co., Middle Town, Ohio, U. S. A. Other addresses you require appeared several times in these columns.

3063 D. N. G. R., Tiruwadi.—The book you require may be bought of Butter Worth & Co., 8, Hastings Street, Calcutta.

3068 R. R. B., Jaipur.—There is no such school or college known to us.

3070 B. M. S., Adoni.—Wants to be put in touch with direct importers or manufacturers of glass ware, enamel ware, hardware and fancy articles of Bombay. For selling carpets advertise in the pages of newspapers and periodicals.

3071 K. C. B., Aligarh City.—Tin boxes of sizes required may be supplied by Calcutta Colour Printing Works, Post Box 6772, Calcutta and Rampratap Gajanand, 6 Halsi Bagan Road, Calcutta.

3073 D. R. L., Raekot.—It is not possible for us to advise on the merits or demerits of the well-known watches of the trade; that is beyond our scope. Moreover, we do not see any usefulness in studying the problem so scrutinisingly except as a hobby. We have not bestowed any attention on the problem of immigration, but we may revert to the subject in the pages of **Commercial India**. Meanwhile you may communicate with Immigration Officer, Secretariat, Delhi.

3075 R. P. P., Akola.—You may have paper bags prepared locally as per order. For pre-

paring book binder's paste use best carpenter's or white glue, to which, after soaking and heating add 1/20 its weight of glycerine. Papers of all sorts may be supplied by Ghose Bros, 63 J, Radha Bazar Street, Calcutta.

3076 V. S. D., Multan Cantt.—Calendars are printed by Calendar Mfg. Co., 62-66 Meadows Street, Fort, Bombay and Manek Lal Maganlal & Co., 79 Cowasji Patel Street, Fort, Bombay.

3077 P. L., Kapurthala.—Refer your queries regarding market of curios and novelties in the West to the High Commissioner for India, Grosvenor Garden, London.

3079 K. C. D., Barisal.—For silk yarn you may try Lukhmanji, 65 Canning Street and Sheriff Damji & Co., 9 Zakariah Street; both of Calcutta. For disposing of mantles you may write to Fanj Bhusan Kundu, 85, Harrison Road and Surendra Nath Paul, 186 Old China Bazar Street; both of Calcutta, whether they are willing to take your goods. In the beginning it will be advisable for you to appoint some agents and representatives in different parts of India.

3081 K. V., Bapatla.—It will be advisable for you to procure carbon rod from the market. Carbon rod may be bought of McLawrie & Co., 35 Ezra Street, Calcutta. It is not possible to utilise drycell battery for lighting purposes. Cocogem, etc. are patent articles hence their recipes are not known. Sodium bicarbonate, washing soda and citric acid may be bought of D. Waldie & Co., 1 British Indian Street, Calcutta and B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta.

3082 P. K. M. Q., Hyderabad.—For American Encyclopedia write to Thacker Spink & Co., 3 Esplanade East and Book Co., 4/4A, College Square; both of Calcutta.

3083 B. C. Rewari.—Letters are not generally replied by post unless 4 as. stamps are attached therewith.

3084 K. N., Yeotmal.—A good recipe of tooth powder will be found in March 1925 issue.

3085 H. C. S., Cuttack.—Iron safes may be bought of R. N. Mukherjee, 120 Shova Bazar Street, Calcutta.

3086 M. S. H., Mewar.—Refer your query to the Marine Department, Government of Bombay, Bombay.

3088 A. S. C., Madras.—Clocks, watches and accessories may be bought of Madorina Watch Co., Ltd., King's Bldg., Hornby Road, Bombay; Anglo-Swiss Watch Co., 6 & 7 Dalhousie Square, Calcutta; Hormasji & Co., 225-227 Hornby Road, Fort, Bombay and Abretch & Co., 17 & 18 Radha Bazar Street, Calcutta. It is not feasible to remove rust, without rubbing the article.

3089 A. P. V., Nawadah.—Light railway materials may be bought of Martin & Co.,

Clive Street, Calcutta. For 'level' printing write to Calcutta Fine Art Cottage, 76 Dharamtala Street, Calcutta. Homeopathic medicine may be bought of Tuck & Raphael, New York, U. S. A.

3090 N. R., Akyab.—Reply to your queries appears under No. 2812.

3092 R. M. R., Ahmedabad.—For tri-colour blocks enquire of Calcutta Fine Art Printing Syndicate, 147 Baranosi Ghosh Street, Calcutta. Zinc sheet, copper sheet, etc. may be bought of Balmer Lawrie & Co., 103 Clive Street, Calcutta. For books on block making enquire of Thacker Spink & Co., 3 Esplanade East, Calcutta. For rectifying defects of roller composition consult an expert.

3093 K. N., Etan.—Sheet metals are imported by Angus Keith & Co., 98-4 Clive Street, Calcutta; Gopalji Chapsi & Co., 303 Hornby Road, Fort, Bombay; K. D. Chatterjee & Co., 15 Raja Woodmunt Street, Calcutta and Goverdhandas Maneklal, 69-3, Canning Street, Calcutta. Aluminium, bronze, etc., may be supplied by Dorchester Brass and Aluminium Foundry, Hyde Park, Massachusetts, U. S. A.; James Graham & Co. New Haven, Connecticut, U. S. A.; Keystone Bronze Co., Pittsburgh, Pennsylvania, U. S. A.; Aluminium Corporation Ltd., 4 Broad Street Pl., London E. C. 2; The British Aluminium Co. Ltd., 109, Queen Victoria Street, London E. C. 4 and Alma Foundry Co., 1 Hale Street, Islington, London N. 1.

3094 S. S. K., Bombay.—You may write to Indian Poultry Keepers and Agriculturists Ltd., Ghosh Shaha & Co. Ltd., 60 Metcalf Street, Calcutta for your requirements.

3095 M. A. H., Rangunj.—For books on cigarette manufacture write to Book Co., 4/4A, College Square and Thacker Spink & Co., 3 Esplanade East; both of Calcutta.

3096 B. D. S., Meerut City.—For calendars and pictures refer to No. 3076.

3097 G. B. C., Maldah.—For German Sewing machine enquire of Indo-German Trading Co., 27 Pollock Street, Calcutta.

3098 S. A. K., Ratnagiri.—Recipe of preparing artificial assafoetida appeared in July 1923 issue. For therapeutic properties of Indian herbs consult an Ayurvedic Physician.

3099 M. C., Delhi.—Advertisement is perhaps the best medium both for collecting and selling secondhand books. You should sell the books taking reasonable profits. Now industrial and commercial books have considerable demand.

3100 P. D. V., Gwalior.—Lead foils may be bought of Balmer Lawrie & Co., 103 Clive St., Calcutta and Amitava Ghose, 133, Canning Street, Calcutta.

3101 D. D. T., Lansdowne.—Paper cutting and stitching machines may be had of Ashutosh Auddya & Sons, 16 Lower Chitpur Road and

John Dickinson & Co., Mercantile Bldg., 1 Bentinck Street; both of Calcutta.

3103 S. B. S. C., Amalmer.—For photo enlargement write to The Qualis Photo Co., 733 Fulham Road, London S. W. C.

3105 G. R. V., Shahpur.—Tablet making machines may be bought of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, and Calcutta Industries Ltd., 136-37 Manicktala Main Road; both of Calcutta. Tallow may be bought of Calcutta Tallow Mart, 19 Tiretta Bazar Street, Calcutta. Silicate of soda may be bought of D. Waldie & Co., 1 British Indian Street and B. K. Paul & Co., 1-3, Bonfields Lane; both of Calcutta.

3107 G. V. S. C., Madras.—For calendar refer to No. 3076 above.

3108, G. P. B., Bark.—Colours may be bought of Amin Chand Mehra & Sons, 34 Armenian Street and Hansraj Vishram, 13 David Joseph Lane; both of Calcutta. Glass wares may be supplied by Satya Charan Paul & Sons, 194 Old China Bazar Street, Calcutta. Hinges and screws may be had of Subol Chandra, Dutt & Sons, 208 Harrison Road, Monohar Das Chuck and Abinash Chandra Dutt & Co., Monohar Dass Chuck; both of Calcutta. For flour mill and oil engines write to Marshall Sons & Co., 99 Clive Street and T. E. Thomson & Co., 9 Esplanade East; both of Calcutta. For cloths enquire of Harchand Roy Hookamchand Todi, 62 Cotton Street and Haribux Doorga Prasad, 182, Cross Street; both of Calcutta.

3111 A. K. S., Muradpur.—An article on rubber stamp manufacture appeared in January 1924 issue.

3112 K. R., Nabha.—You may use edible colour for painting lips.

3113 M. H. P. G., Banganapalle.—For distilling apparatuses enquire of Scientific Supplies Co., 29-32 College Street Market, Calcutta. Refer your other query to the Director of Agriculture of your province.

3114 G. K. N., Trichy.—Patent medicines may be supplied by Martin & Harris, 8 Waterloo Street, Calcutta. Stoppered glass bottles may be supplied by C. K. Dass & Sons, 17 College

Street, Calcutta. Drugs may be bought of B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta. Refer your other queries to a physician.

3118 V. C. R., Anuppupalayam.—Address of International Institute of Physical Culture is Nicholson Road, Lahore. Bleaching machines may be bought of Symington Cox & Co, Mercantile Bldg., 1 Bentinck Street, Calcutta. For removing fruit stains apply warm chlorine water.

3120 S. C. R., Hooghly.—Match splints and veneers may be supplied by Bengal Small Industries Co., 91 Durga Charan Mitter Street and Bhawani Engineering & Trading Co., 122/1, Upper Circular Road; both of Calcutta. Recipes of matches will be found in September 1923 issue.

3124 S. N. H. B., Mergui.—Worsted goods may be supplied by Hiltermann Bros, Eastern House, Harris Street, Bradford and Hinchliffe Bros, 56 Whitworth Street, Huddersfield; both of England. Engineering goods may be supplied by Rangoon Engineering Works, 57 Botataung Street, Rangoon and United Engineers Ltd., 24/1 Merchant Street, Rangoon. Your other query is outside our scope.

3126 J. N. B., Agra.—An article on boot polish manufacture appeared in June 1923 issue. You may polish mirror with methylated spirit. The address your refer to is not traceable.

3127 N. L. D. F., Calcutta.—Wants to be put in touch with suppliers of country simool wood logs, mango wood logs, tamarind wood logs, babul wood logs and suppliers of wood.

3132 B. P. S., Gorakhpur.—Formula of cocogem is not known.

3134 C. C. S., Wadhwan City.—For particular information regarding soap manufacture and oil extraction take expert advice. Soap manufacturing apparatuses may be bought of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta. Process of preparing castor oil for medicinal purposes will be found in September 1924 issue of *Industry*.

3135 S. V. T. W., Tuni.—Particulars of notable exhibitions held in India are occasionally published in the columns of this journal. For provincial list of exhibitions write to the Directors of Industries of various provinces.

NOTE.

Mr. E. Lakkaraju Naidu, the recipient of two prizes for New Idea competition for 1924-25 records his warm appreciation of the silver medal awarded to him. These small prizes, apart from their intrinsic worth, acquire a value in association with *Industry* encouraging both literary and industrial activities of the readers. We are too willing to substitute medals for cash prizes should the winner desire so.

LIMITATION OF FAMILY.

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NOTICES AND REVIEWS.

A Household Journal.

Home and Homeopathy Editor Dr N M Choudhuri, M D Published monthly from 2, Middleton Row, Calcutta

The main theme of the journal under review comprises health and hygiene with topics of interest on medical science generally. The subjects are treated with special reference to tropical conditions. An important section is devoted to problems of economy, science, art, industry, commerce and topics of household interest.

A Trade Directory

The Trades Directory of India, Burma and Ceylon, Published by Modern Advertising Bureau, 14, Irulappan Street, Madras E

Much practical information of interest to traders and businessmen may be found in this handy directory. Besides it contains many addresses of merchants all over the country.

Metal Polish.

A sample packet of Mittal's Brass Polish in powder form has been sent to us by Messrs Imruti Rai Chandu Lall, Lakhen Gate, Saharanpur. It is useful for polishing tin, brass and copper articles.

Tooth Powder.

Mr Nityanand Chatterjee of Eczemon Laboratory, 193 Chuck, Allahabad has prepared a medicinal dentifrice and put on the market under the name of Carbothymol Tooth Powder.

Useful Diary.

Mr Ram Narayan Lal, Publisher and Bookseller, of Allahabad has complimented us with a copy of his useful Victory Diary for which our sincere thanks.

Greetings.

Inside a neat pretty card from Messrs T Sivasankaran & Bros, Cannanore, Malabar are conveyed warmest greetings which we hasten to reciprocate thousandfold.

Blotting Pad.

We thankfully acknowledge receipt of a serviceable blotting pad from Seth Depchand & Sons, Old Sukkur (Sindh) dealers in confectionery machinery and allied sundries.

Calendars

We are indebted to The Modern Art Press, 21 Hyat Khan Lane, Calcutta in respect of calendars and a date card.

We are glad to receive from Messrs Purna Chandra Kundu and Sons, paper merchants, 139 Old China Bazar Street, Calcutta, a beautiful calendar.

We have received from Messrs Chunilall Askaran & Co Dealers in Assam Silk Threads, P O Seleng hat (Assam) an almanac containing pictures of Indian leaders.

We are in receipt of a wall calendar from the German Novelty Stores, Cocanada and another from Sri Dattatreya Coffee Works, Mysore Road, Bangalore City.

Mr S V Sovani, B Sc, Bombay 4, dealer in scientific apparatus has sent us a two-year calendar with a bold picture.

Messrs Mukherjee Bros & Co, 17-19, R G Kar Road, Calcutta, well known tea merchants, have kindly favoured us with two of their calendars with tricolour pictures.

Our indebtedness to the Oriental Soap Works Tanjore for a pictorial calendar and to The Mahabir Press for a nice almanac.

Mr B N Bysack, 111, Ram Chand Ghose Lane, P O Beadon Street, Calcutta, manufacturer of rubber stamp deserves our thanks for a couple of pictorial calendars.

Through the good service of Messrs B Dattaram & Co, Grand Road, Bombay, we have received a calendar of the Lokmanya Agency.

Messrs P Bhaskaram & Bros, Rajahmundry, Ayurvedic Chemists and Druggists have sent us a calendar.

French Reader.

Easy French Reader, Part I By Dr. Pashupati Nath Shastri, Ph.D. Published by Mr. Ashokenath Bhattacharya, B.A., at 41, Bagh Bazar Street, Calcutta. Pp. 64. Price Rs. 1 only.

Dr. Shastri has ready familiarised himself as a linguist by the publication of his German primers. This time he has come out with French Readers. The comprehensible manner in which he has written the book under review makes it possible for those who wish to learn French without the assistance of tutors to do so easily.

A Thoughtful Pamphlet.

The Condition of Villages in Bengal and some Suggestions about their Reconstruction by Babu Sailendra Nath Mitra.

We commend the pamphlet to the notice of those who are interested in village reconstruction work as they will surely profit by it. The author, a benevolent zamindar, has drawn a sad but true picture of the piteous conditions of the villages in Bengal and has made some plausible suggestions about their revitalisation. Written from personal knowledge his observations will carry conviction to the reader. If more such worthy members of the landed aristocracy evinced interest in the welfare of the agricultural communities committed to their charge they could easily help to bring about plenty and prosperity which is the great desideratum at the moment.

TRADE ENQUIRIES.

[To communicate with any party write him direct with name and address as given below, mentioning **Industry**.]

3036 B. Keshava Murthi, Hole Narsipur, Hassan.—Can supply 1000 tons of crude asbestos.

3037 P. Papayyaji, Khadi Pratisthan, Tum.—Wants a capitalist to take lease of a manganese mine in Vizagapatam Dist.

3042 The General Advertising and Forwarding Agency, 42, Keyzer Street, Colombo, Ceylon.—Desire to be introduced to poultry merchants of Alleppey, Tuticorin and other countries in India.

3065 S. S. Batteja & Co., Andersshahr, Peshawar City.—Wish to be put in touch with importers of dried fruits, crude drugs, furs, skins and carpets in Straits Settlements.

3119 U. S. Mani, 30, Holland Road, Nega-patam.—Wants to be introduced to suppliers of peacock's fat.

3174 J. M. N., Kulshrestha, Fatehgarh.—

Wants to know the address of Mosul Oil Co., in India and of agents of various foreign typewriters in India.

3203 Harish Chandar & Bros., Chamon, Beluchistan.—Can supply guts, leather and fruits of Afghanistan.

3215 Harbans Lal Vaish, Najibabad.—Wants to be put in touch with suppliers of brooms.

3251 Abdullah Vali Mahomed, Allahabad Street, Napier Road, Karachi.—Desires to buy horse hair, horns and hoofs of animals, horn tips and feather.

3253 Krishna Kumar Shaha, 25 Shova Bazar Street, Calcutta.—Wants an expert in making washing soap.

3265 K. Subba Rao, Chakradharpur.—Wants to buy raw skins of silver foxes, lizards and pythons.

3306 S. Bhattacharjee & Sons, 58, Procession Road, Santipur.—Can supply silk, cotton, tamarind and betel leaves.

3330 Md. Amir Khan, Abgila, Nawabcoti, Baniadgunj, Gaya.—Can supply soapstone, graphite, asbestos, garnet and wolfram.

3338 The Andheri Industrials, Marol Road, Andheri, Bombay.—Desire to be put in touch with dealers in soap powder.

MARCH ISSUE OF INDUSTRY.

(In the Press).

The March issue of **Industry** which will appear on the last date of the month will contain a number of informative articles in addition to the regular features such as Formulas and Recipes, Queries and Replies, etc. Any friend of our subscriber may have a copy free as sample on application to the Manager, **Industry**.

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At the time of sending a V. P. P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V. P. P. For particulars and Advt. rate please write to—

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Mr. A. K. Lukansy, Palmgroves, Bingerville (Ivory Coast); writes.

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(2) **Rai R. S. DHOND SAHEB, Durbar Wakil to H. H. the Maharaja Gaekwar of Baroda,** says—"* * * The Kaviraj undertook a serious case of insanity of the wife of one of my friends who was about to be placed in the Asylum but he restored the lady to her senses in a very short time. Another lady had several complaints—Phthisis, Piles, Palpitation of heart and what not. Under the Kaviraj's treatment she looks quite healthy now. His medicines are reliable. * * *"

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Co-operation Special Number.

The April Issue of

Industry

WILL BE THE SPECIAL CO-OPERATION NUMBER IN WHICH

will be dealt in working details all the possibilities of co-operative movement in India—co-operation between work, brain and money. This includes organisation of labour, combination of intelligence and consolidation of money.

The April Number of **INDUSTRY**

Will deal in all these phases of co-operation and besides the usual features will show ways of the consolidation of Industries on the basis of Co-operative Education, Co-operative Banking, Co-operative Production and Co-operative Trading in which the Commonest people of the country may have common interest with a view to common as well as to personal profit.

The Number Being The First of Vol. XVII

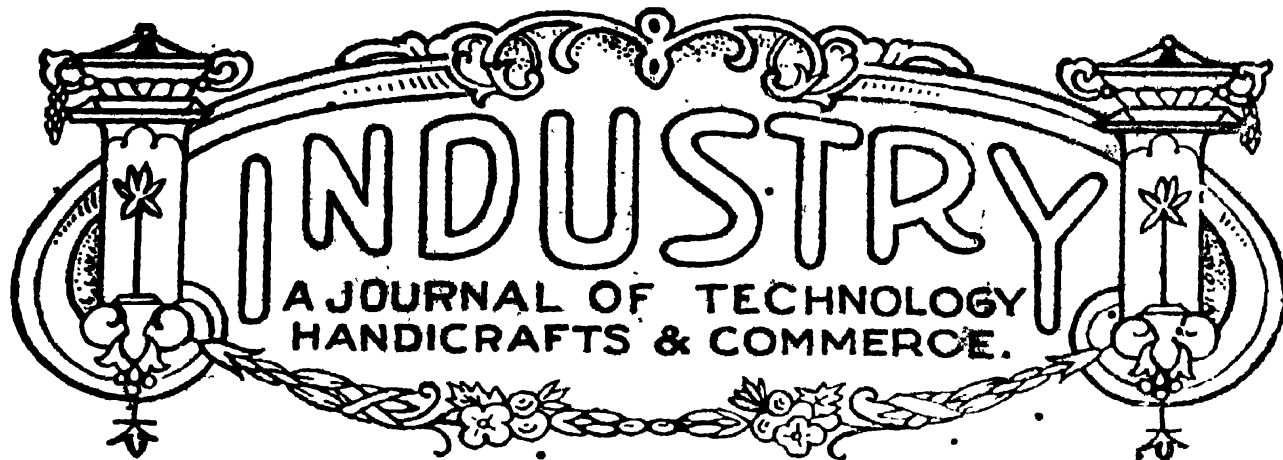
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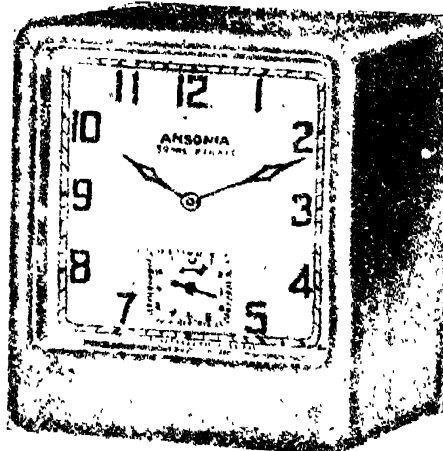
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No. 192.

APRIL WILL BE THE CO-OPERATION NUMBER.

The April number will be the first of Vol. XVII. INDUSTRY passes the sixteenth year of existence with this number.

It has now the experience of sixteen live memorable years at its credit for the service of its readers.

The wise men learn from others' experience, they buy the common experience ready-made and not make their own experience at terribly high cost.

In its pages INDUSTRY is teaching you what other people experienced. The seventeenth Vol. will be a specialization of others' experience—you can get that for a pittance.

WE EXPECT EVERY READER OF INDUSTRY
TO DO DUTY TO IT BY ENLISTING A NEW
SUBSCRIBER FROM AMONG HIS FRIENDS—A
SACRED DUTY TO HIMSELF AND TO COUNTRY.

The April issue will reach every subscriber by V. P. P. for the new volume's subscription. Those who wish to avoid V. P. P. are requested to pay up before the end of March or intimate us by that time. Otherwise the V. P. P. should be awaited in April.

The return of the V. P. P's is a drain upon the resources that are devoted to the service of country's industrial development. We expect every one of our readers to understand it.

MAKING LIFE WORTH LIVING.

THAT remarkable dialogue between the learned man of the East and the boatman has become celebrated throughout the land owing to the perennial teaching it has to impart. The learned man who was very proud of his scholarly attainments, so runs the story, was being rowed across a river in Bengal by a boatman, who belonged to a class which is generally illiterate. Entering into conversation with the boatman the learned man asked him if he had ever studied philosophy.

"No," was the reply.

"Then a quarter of your life is lost. Did you ever study mathematics?"

"No," was again the reply.

"Then another quarter of it is lost. Did you know anything about astronomy?"

"No."

"Well then another quarter of your life is lost."

Just then a violent squall struck the boat and the boatman turned and said "Sir, can you swim?"

"No," muttered the horrified lips of the Pundit.

"Then the whole of your life is lost --for the boat is going to the bottom."

When the examining season of our Universities is on us and when thousands of our students from schools and colleges will soon be coming out to grapple with the practical side of life the story comes to our mind with a remarkable moral.

The question that dawns in every intelligent mind is whether the University is launching out our boys with any

training that would enable them to lead a life worth living.

Many of our young University men are as proud of their academic learning as was this learned man of the East—and as ignorant of the actual requirements of the battle they are facing as he was of the art of swimming. Their diploma appears to them to be a sort of magic wand that will insure them against all accidents, fit them to cope with every emergency and compell all doors to fly open to them until the hard knocks of the practical life teach them that the diploma will not enable them to cut any big figures as they had expected.

The hard knocks of life are gradually teaching our people, when it is too late, that no amount of scholastic training nor any amount of theories ingrained in the colleges stand him in good stead. The hard facts of the life show that elements of success are right inside the man, in the power to think and act independently.

Are the universities waking to this phase of the study that they are imparting to the students? In whatever circumstances you live, in whichever environments you are bred up whether you will render great service to the world or be a comperative failure depends upon just this—the character foundations you have laid and the degree of originality, constructive mental power, and initiative you have developed.

But do our universities attempt any development of this character foundation in our boys?

The tremendous competition of to-day when the world is rushing at break-neck speed to the eminence of material prosperity, crushing all the slow-goers, the timid and the contented, compels the untrained, unambitious mind to fall back. You have a claim, you youngmen just out in the practical life, to live the life worth living. The marvellous world of opportunity that is open to you, the boundless prospect of the future that stretches before you, is enough to thrill the soul and to fire the imagination of all but those who have no imagination.

But are our universities prompting that imagination in our youngmen? The present day world does not want merely phonographs, able to repeat things talked into it. Men who are able to grasp principles with vigour - able to analyse and synthesize - to think consecutively, logically and to apply theory in successful

practice, those whose initiative and faculties have been developed, in whom the power which creates and leads is cultured, are in demand for successful competition in the practical world of action and progress.

We know of too many college students—with caps and gowns who are utter failures, liabilities to society instead of assets. There are many graduating every year who have derived no benefit from their college course and will never amount to anything; yet these are the people who have the stuff inside of them that should make the successful man leading the nation to prosperity and success.

In the last month we have shown how the too much literary training in our primary classes is producing boys unworthy of present day progress. We see now that our universities are producing parrots without initiation.

THE AGE OF CO-OPERATION.

Co-operative activities in all the progressive movements in the country will be the predominant feature of advancement in the coming age.

The bearing of co-operation on the economic and material progress of the nation is now self-evident.

Immense possibilities await the co-operative movement in Agriculture, Industries, Trade, Finance, etc. The country is looking forward for a definite lead in the application of co-operative principles for the development of its people.

Our education, sanitation, village reconstruction work await organisation on co-operation basis.

The April Special number of INDUSTRY on Co-operation will deal with the subject on practical lines offering suggestions on actions for the amelioration of the mass and class.

PLANTAINS AND BANANAS.

PLANTAIN is the name applied to various species of the genus *Musa*, of which the best known species are *M. paradisiaca*, which yields the edible plantain or banana and *M. textilis*, the Manila hemp plant. The bananas appear to be indigenous to the southern portion of the Asiatic Continent. Transplanted at an unknown epoch into the Indian Archipelago and Africa, they have spread also into the new world, and in general, into all intertropical countries, long before the arrival of the Europeans. Humboldt puts a very high value on this fruit, as an article of food. According to him it affords, in a given extent of ground, forty four times more nutritive matter than the potato, and 133 times more than wheat. These figures must be considered as only approximative, since nothing is more difficult than to estimate the nutritive qualities of different aliments, and in India it is only used as a dessert. In Jamaica, Demarara, Trinidad, and other colonies, however, many thousand acres are planted with these trees. The vegetation of this tree is so rapid that if a line of thread be drawn across, and on a level with the top of one of the leaves, when it begins to expand, it will be seen, in the course of an hour, to have grown nearly an inch. The fruit when ripe is of a pale yellow, from two or three inches to a foot in length and two inches thick, and is produced in bunches so large as each to weigh 40 lbs. and upwards. In the Straits Settlements, the most approved varieties are the royal

plantain, which fruits in eight months; one which bears in a year, the milk plantain, the downy plantain and the golden plantain or banana. A variety



Fig. 1. Banana Plant.

termed Guindy is exported from Madras, where it is in great esteem. It has this advantage over the other kinds, that it can be stewed down like an apple while they remain tough. The Malays allege that they can produce new varieties, by planting three shoots down to the ground three successive times when they have reached the height of nine or ten inches. In some districts of Mexico the fruit is dried in the sun, and in this state forms a considerable article of internal commerce under the name of "plantado pasado." When dried, and reduced to the state of meal, it cannot, like wheat flour,

be manufactured into maccaroni or vermicelli, or at least the maccaroni made from it falls to powder when put into hot water. The fresh, plantation, however, when boiled whole, forms a pretty dense firm mass, of greater consistency and toughness than the potato. The mass, beaten in a mortar, constitutes the "foofoo", of the negroes. The plantain meal cannot be got into this state unless by mixing it up with water to form a stiff dough, and then boiling it in shapes or bound in cloths. The fibre of the stem is equal in texture, clean and aromatic. Although perhaps there is no province in India in which plantains are grown to so great an extent as in Pegu, (Burma), yet there are scarcely good plantains to be had in that province. This is owing to the Burmese habit of only eating green fruit, and their total indifference to the finer qualities of flavour. The great use of all fruits with the Burmese is to serve as an addition to their curry, for which purpose one kind of plantain is just good as another. The plantain or banana, holds the same

place in Tenasserim that the apple does in England and the United States. It is used as a vegetable as well as an article for the dessert, the great proportion being eaten with rice and meat in the place of potatoes. Like the mango, the tree is indigenous in Tenasserim, but the wild fruit is too full of seeds to be eatable.

The plantain and banana embrace many varieties. The Manilla hemp, from which a fabric of the finest texture is prepared, is made from the leaves of the *Musa textilis*. Another distinct species of this genus grows wild in Tenasserim jungles, and is rather an ornamental plant, which is all that it has to recommend it. Unlike the common plantain it never throws up shoots from its roots. Several varieties of the banana are cultivated in the Deccan,—the large red, the green and the yellow. A small sort, which is supposed to be the real banana of the West Indies, is perhaps the most luxuriant. The plants blossom at all seasons, and so soon as the drupe of fruit begins to ripen, which is known by some turning colour, it is cut and hung up to ripen in the house. The plant will not bear again, and if not cut down it will perish of itself, when the surrounding shoots grow up and blossom as the former. The plants are generally grown in beds or clusters in a good rich soil when fine fruit is almost the sure return. In transplanting the shoots of two or three feet high, about one half is generally cut off and the green fruit is used in curries. In some parts of India, the extremities of the flower shoots, the heart of the stem, and that portion of it



Fig. II. Flowering Stalk.

A—Flowering Stalk. B—Female Flowers.
C—Male Flowers.



Fig. III. Plantain Tree.

from which the roots proceed are used in curries.

The stem yields a fine white silky fibre of considerable length, specifically lighter than hemp, flax and aloe fibre, by 1-4th or 1-5th and possessing considerable strength. The plant is cultivated everywhere in Southern India where there are numerous varieties yielding fibres of very different quality. The fibre of this plant has a particular tendency to rot and to become stiff, brittle and discoloured by steeping in the green state, and it has been ascertained by trial that the strength is in proportion to the cleanness of the fibre. If it have been well-cleaned and all the sap quickly removed, it bears immersion in water as well as most other fibres, and is about the same strength as Russian hemp. The coarse large fruited plantains yield the strongest and thickest fibres, the smaller kinds yield fine fibres, suited for weaving

and if carefully prepared, these have a glossy appearance like silk. This gloss, however, can only be got by cleaning rapidly, and before the sap has time to stain the fibre, it is soon lost if the plant be steeped in water.

Almost every part of the plantain, may be converted into fibre, but it most abounds in the stem and leaves, and can be made available for textile or cordage purposes. The combings or tow separated during the preparation of the fibres is of value as a substitute for horse hair, for stuffing mattresses, etc., and the peduncle of the core can be pounded into pulp for the paper makers and form an excellent material for the finest or the toughest kinds of paper.

In the West Indies the spiral vessels are employed as tinder. In the process of separation the stem should be cut down six inches above the ground, and then divided longitudinally into four parts, and the juice expelled by passing each slip longitudinally through the common sugar mill with grooved hard wood rollers or a mill, the rollers of which are three feet long and one foot in diameter. In the process of crushing the stalks and the harder and softer parts of the stem should be passed through separately, which can be easily effected if the rollers be horizontal. In this way, the produce will be four or five pounds of fibre from each tree. The fibres from the midrib of the leaf are the bast and in general if the stem yield four pound nett of fibre the stalk will give 1 lb. out of four. After the crushing the fibres are to be well washed and boiled in soda or other alkaline ley to separate the

gluten and colouring matter, keeping the fibres from the several parts quite separate, in this process of boiling. They are then bleached and the highest coloured fibres do not require more than six hours, but the darkest, from twelve to eighteen. The fibre from the stem is fine, white and silky of considerable length; specifically lighter than hemp, flax and aloe fibre, by $\frac{1}{4}$ th or $\frac{1}{5}$ th and possessing considerable strength.

It can be made into string, line, or rope, and manufactured into cloth. The fine grass cloth, ship's cordage, and ropes used in the south-sea whale fisheries are said to be made from the fibres of varieties of *Musa*. As in all the plantain tribe, the leaves yield the thickest and strongest fibres. The finest plantain fibre when carefully cleaned and dressed, in what may be termed the "fresh process," in contradistinction to the system of rolling the fibres free, has been said to be well suited for the imitation of silk in carriage braid and carpet work.

The wild fruit is not edible, from its containing many seeds. On the Arracan Coast, the layers of the stem of the plantain are sold in a dried state, some of it even twisted into a bast rope. It would probably command a good price as a cordage or paper material, or for textile fabrics.

Plantain meal is prepared by stripping off the husk of the fruit, slicing and thoroughly drying the core in the sun after which it is powdered and sifted. It has a fragrant odour and its flavour is said to depend a good deal on the rapidity with which the slices are dried. It should be husked and sliced by nickel or bamboo knives, as those of steel injure the colour of the meal. It is calculated that the fresh plantain will yield 40 per cent. of meal, and that an average

bunch of 25 lbs. weight will yield 5 lbs. and that an acre of plantain walk of average quality producing 450 bunches during the year, would yield upwards of a ton of meal. In the West Indies plantain meal is largely employed as the food of infants, children and convalescents. In composition the plantain fruit approaches most nearly, in nutritive quality to the potato, and the meal of the plant to that of rice.

In South America the fruit is not only used as an article of diet in its fresh state, but when dried forms an article of internal trade, besides having its flour separated and cooked or made into biscuits. The plantains at Bassem, where the cultivation is most extensive, are delicious in flavour and the people of that place practise the art of preserving them.

Those varieties of banana which are rich in saccharine matter, make an admirable preserve, on being skinned and split longitudinally and dried in the sun, by which process they immediately acquire a consistency like Turkey figs, and become capable of being packed and preserved in the same way.



Fig. IV. Plantains and Bananas.

PREPARATION OF ESSENTIAL OILS.

(By A Practical Expert.)

THE underlying principle for the preparation of essential oils is practically the same in every case. The articles are bruised and steeped in a sweet oil such as olive or sesamum, heated on the water or placed in the sun for a number of days. Sometimes the two processes are adopted consecutively and often repeated. The utensils are commonly available and the methods are simple. The oils obtained are valuable and have mostly medicinal applications.

AMLA OIL.

Take 2½ srs. sesamum brayed to a paste, 5 srs. emblic myrobalan free from seeds and bruised, and 10 srs. sesamum oil. Put the three ingredients together in an iron vessel and place it in the sun for one month. Strain out only 5 srs. of the soaked oil and put in a fresh lot of 5 srs. sesamum oil. Leave aside for one month; strain out again 5 srs. of oil and put in a third and fresh lot of 5 srs. of oil. Repeat the operation for 6 months.

Then strain the whole of the oil and mix together the former quantities. Put in a covered vessel.

Amla oil prepared in this way serves as a good hair dye. Smear the head with it every day half an hour before bath. The hair will be dyed black and no grey hair will be noticeable.

AMLA OIL.

(Another Recipe.)

Take 4 srs. of raw and good sesamum oil and 4 srs. cleaned and seeded emblic myrobalans. First steep the myrobalans in water for 24 hours; pound them thoroughly and dissolve in 16 srs. of

water. Then put the oil in an iron pan and apply moderate heat. When the oil has bubbled for some time and the froth has subsided remove the pan some distance away from the oven. Now take a ladle with a long handle, fill it with the above decoction of myrobalan and sprinkle the same on the hot oil. This should be done from a distance, taking every precaution to prevent any accident. Just as the water will be poured on the oil there will be a deafening sound; but the operation should be carried through without any fear. After the whole quantity of the decoction is thus blended with the oil, put the pan on the fire and continue boiling. When the water has evaporated remove the pan and set it aside with the oil for 7 days. Finally filter and bottle.

AMLA OIL.

(Another Recipe.)

Take 5 srs. pure sesamum oil and put the same in a porcelain jar. Also take 2½ srs. of cleaned, picked and seeded emblic myrobalans. Steep the myrobalans in the oil and place in the sun for one month. Then grind the two together and put the mixture in a porous iron pot. Hold a vessel under the hole and place the arrangement in strong sun. The oil will drip off. Collect it till the last drop and finally bottle.

BAHERA OIL.

Take ½ sr. kernel of the seeds of belleric myrobalan and macerate with ½ sr. fermented rice (kanji) and put the mass in a porous iron pot. Hold a vessel under the hole. Collect the oil that

drips off and put in a bottle. Its daily use makes the hair black.

PUMELO OIL.

• Peel off the green skin of Pumelos and mince it with a knife. Take half and put in a vessel. Pour into it one seer good olive oil. Then heat the vessel on the water bath for half an hour. Remove and cover up the mouth of the vessel closely. Place it in the sun every day for one month. Then strain and bottle. The oil will be nicely scented.

ORANGE OIL.

Take one seer of fresh peels of orange and mince them. Take also one seer of olive oil. Put the two together in a vessel and heat on the water bath for half an hour. Remove and place it in the sun for a month. Finally strain.

LEMON OIL.

For this purpose citrus lemon of the Pati variety will be required. Take half a seer of its fresh peels and 1 seer of olive oil. Put the two together in a vessel and heat on the water bath for half an hour. Remove and leave aside for 24 hours. Then press out the oil.

Put the oil again in the vessel and steep in it another lot of one poa dry peels of lemon grated finely. Close up the mouth of the vessel and place it daily in the sun for one month. Finally strain and bottle in a stoppered phial.

LIME OIL.

Take one seer green peels of lime of the *Kagzi* variety and half seer of good olive oil. Put the two together in a vessel and heat on the water bath for half an hour. Place it in the sun for 20 days and then press out the oil. Finally put in stoppered phials.

OIL OF CINNAMON.

Take $\frac{1}{2}$ poa of pounded cinnamon and one seer good olive oil; put the two together in a vessel and close it up. Heat on the water bath for half an hour. Leave aside for 24 hours and then squeeze out the oil. Put the oil again into the same vessel and steep in it $\frac{1}{2}$ poa pounded cinnamon. Cover the mouth of the vessel and heat on the water bath for half an hour. Leave aside for 24 hours and then squeeze out the oil. For the third time put the oil into the same vessel and steep in it $\frac{1}{2}$ poa pounded cinnamon. Heat on the water bath for half an hour. Leave aside for 24 hours. Finally strain and bottle in a stoppered phial.

OIL OF CLOVES.

Take one poa bruised cloves and macerate the same in one poa olive oil thoroughly. Put it in a porous iron pot and hold a vessel under the hole. Place the arrangement in hot sun and the oil will drip through the pores. When the oozing ceases, store the oil in a stoppered phial.

OIL OF CARDAMOM.

• Take $\frac{1}{2}$ poa bruised seeds of cardamom major and 1 seer of good olive oil. Put the two together in a vessel, cover it up and heat on the water bath for half an hour. Set aside the vessel for 24 hours. Press out the oil and put it again in the vessel. Steep in it another lot of $\frac{1}{2}$ poa cardamom and heat in the water bath for half an hour. Set aside for 24 hours. Squeeze out the oil once more, steep in it a third lot of $\frac{1}{2}$ poa cardamom and heat on the water bath for half an hour. Set aside for 24 hours. Then

press out the oil thoroughly and store in stoppered phial.

OIL OF CASSIA.

Take 1 poa pounded white cassia leaves and 1 seer good olive oil. Put the two together in a stoppered phial and close up the mouth neatly. Place it in strong sun for two months. After that press out the oil and store it in a stoppered phial.

OIL OF ANISE.

Take half seer aniseed; pick and dust carefully; and pound them. Macerate them in $\frac{1}{2}$ sr. good olive oil and put the pulp in a porous iron vessel. Hold a vessel under the hole and place the whole arrangement in bright sun. The oil will drip. When it is exhausted put the oil in a stoppered phial.

OIL OF CUBEB.

Take one poa picked cubeb and bruise finely. Put the same in a stoppered phial and pour in 1 sr. good olive oil. Close up the mouth tightly and place in the sun for 3 months. Finally strain and bottle in stoppered phial.

OIL OF OLIVES.

Take $\frac{1}{2}$ seer kernel of olive seeds, $\frac{1}{2}$ seer sesamum and $\frac{1}{2}$ seer sesamum oil. Macerate these three ingredients together put in a stoppered phial and close up the mouth tightly. Place it in the sun during day time and in the dews at night continuously for 3 months. After that period squeeze out the oil by hard pressure. Finally bottle in a stoppered phial.

NEEM OIL.

Take $\frac{1}{2}$ sr. kernel of Neem seeds and 1 sr. sesamum. Grind the together into a fine pulp. Put the same in a porous

iron pot and hold a vessel under the hole. Place the arrangement in the sun until the oil drips off completely. Store the oil in a stoppered phial. This is a very pure Neem oil.

NEEM OIL.

(Another Recipe.)

Take 1 ch. of Neem leaves and 1 sr. pure mustard oil. Bray the leaves into a fine paste, divide the paste into 7 or 8 pellets and form them flat, like coins. Scald the oil in an iron pan on fire and when the froth subsides and it smokes throw in the pellets of leaves. Continue boiling until they are scorched. Then lift them out carefully with the skimmer and throw away. Take care that these do not crumble in the oil.

SANDAL OIL.

Take 5 srs. of sandal wood dust and 10 srs. of water. Put the two together in a suitable earthen ware vessel for 48 hours. Then place on the water bath at steam heat for half an hour. Remove the vessel, cover it with a fine piece of cloth and place it in the hot sun. After a time a thin film will form on the surface of the decoction. Pick it out gently with a feather or cotton swab and put it gently in a clean phial. A similar layer will appear again and again on the freshly exposed surface. Pick out the films as soon as and as many times as they are formed. Close the mouth of the phial air-tight, place in the sun for a month and store it away.

SANDAL OIL.

(Another Recipe.)

Take $\frac{1}{2}$ sr. dust of white sandal wood and 1 sr. olive oil. Put the two together in a vessel, cover its mouth and heat on

the water bath for half an hour. Remove the vessel and place it in the sun for 7 days. Then press out the oil. Put the oil again in the vessel, steep another lot of $\frac{1}{2}$ sr. sandal dust, cover the mouth and heat on the water bath for half an hour. Remove the vessel and place it in the sun for three days. Press out the oil thoroughly and put it in the above vessel. Steep in it a third lot of $\frac{1}{2}$ sr. sandal dust and heat on the water bath for half an hour. Remove and leave aside for 24 hours. Then press out the oil and store it in a stoppered phial.

ALMOND OIL.

Take 1 sr. decorticated almonds, soak them in cold water for 2 hours and remove the skins. Mix with it 1 sr. good gingelley oil and grind together to a soft paste. Put the same in a porous iron pot and hold a vessel, under the hole. The oil will drip off, collect and store in a stoppered phial.

GLOSSARY.

Almonds.—*Badam*.
 Aniseed.—*Mauri*.
 Belleric myrobalan.—*Bahera*.
 Cardamom.—*Elaich*.
 Cassia.—*Tejpat*.
 Cinnamon.—*Daruchini*.
 Cloves.—*Labang*.
 Cubeb.—*Kabab chini*.
 Emblic myrobalan.—*Amla*.
 Lemon.—*Pati lebu*.
 Lime.—*Kagzi lebu*.
 Margosa.—*Neem*.
 Olive.—*Jalpai*.
 Orange.—*Kamala lebu*.
 Pumelo.—*Batabi lebu*.
 Sandal.—*Chandan*.
 Sesamum.—*Til*.
 16 Ch.=4 poas.=1 sr.=2 lbs.

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BANANAS IN TRAVANCORE.

OF the various varieties of plantains in Travancore the banana occupies the first place in importance. It is most useful as a nutritious food and at the same time the most labour-exacting product. The word banana is widely known and all those who have occasion to be acquainted with it must of course know the sterling qualities of the fruit as an article of food. It is one of the best of tropical fruits, generally grown in South America, West Indies, India and most other places in the same latitude.

In Travancore it is extensively used as an article of food and hence widely cultivated. Banana is cultivated in Travancore on the hill-sides and valleys as a dry crop the heavy rainfall of the province being the reason for its being a dry crop.

The suckers are prepared for cultivation soon after a crop is taken. Different methods are gradually adopted in different parts of the State for the preparation of the suckers. Two, three, or even four are plucked from one underground stem, and dipped in cowdung mixed with water, and dried in the sun, care being taken to protect them from white ants, rats and other animals, which eat away the suckers. The drying will generally take two days.

In some other places another method is adopted. The suckers are arranged in shady wind-swept places with the growing ends pointing downwards and touching the soil so as to prevent growth. They are kept like this for two or three days and then planted.

The shoot present in the sucker at the time of separation from the parent, is cut off just before planting. In cases

where the sucker is dipped in cowdung, the shoots are cut off even earlier. Before planting another shoot may issue forth in the latter. These shoots are either cut away or trampled down.

The planting season is before the commencement of rains. Bananas can be planted twice a year; one crop in November or at the close of October, another in April or May. Even if they are planted after one or two rains it matters only very little. The yield in the latter case would be a little less than the former one. The suckers are planted in pits 2½ ft. by 2½ ft. and a foot and a half or two feet deep, dug 8 or 10 ft. apart. A small pit as large as to fix the sucker is then made in the middle of the large pit, the sucker placed in, and the soil trampled down firmly around it. No watering is necessary. In some places if the soil is very dry a small quantity of water is poured in each pit just before placing the sucker in.

As soon as two leaves of the plant come out, the soil is removed to a depth of a foot and a half round the plant so as not to expose the roots. Dried cowdung, ashes and dry leaves are put in the pit and it is left open. The full growth of the plant is attained in the ninth month after planting. During these nine months the plants should be manured once in a month. Every month after the first green manure should be applied *proportion for 1st month per tree* being cowdung 15 lbs., ashes 8 lbs. and two or three baskets of dry leaves.

The pits should be closed up when manure has begun to putrify. In some places the plants are manured only four times in nine months. The frequency of manuring depends entirely on the comparative fertility of different soils. I have taken the case of a soil not very fertile. Generally the last dose of manure is given in the form of fresh cowdung.

It is generally observed that fruits of plants yielding in the rainy season are

larger than those of plants yielding in summer.

In one acre 400 plants can be planted.

Items of Expenditure for one Acre.

	Rs.	As.	P.
Clearing land	80	0	0
Digging 400 pits	15	0	0
Cost of 400 Suckers			
and transport	10	0	0
Planting	10	0	0
Cost of 6000 lbs. cow-			
dung	10	0	0
Cost of 3200 lbs.			
ashes	7	8	0
Collecting dry			
leaves	7	8	0
Cost of other			
labour	70	0	0
Marketing expenses ...	20	0	0
Expenses total	230	0	0

Items of Returns.

	Rs.	As.	P.
Cost of 20,000 fruit			
at Rs. 2 per 100	400	0	0
Cost of 800 Suckers			
growing from			
mother plants' sold			
at Rs. 3 per 100	24	0	0
Total returns ...	424	0	0
Total expenses ...	230	0	0

Profit 194 0 0

It is very clear from this that banana cultivation is a profitable industry in Travancore.

The fruit besides being used in the raw state as a table fruit, can be dried and preserved for a long time. Many people boil the ripe fruit and then dry it. Others dry the ripe fruit as it is.

Banana has been pronounced as one of the sweetest of fruits by foreigners as well. Therefore the canning of the fruit is a very profitable industry in Travancore.

- - POONA AGRICULTURAL
COLLEGE MAGAZINE.

IDEAS FOR SMALL CAPITALISTS.

Buttons From Nux Vomica.

Mr. E. Lakkaraju Naidu, Kharida Road, Kharagpur sends us the following:—

Most of the buttons without shanks that are imported from United Kingdom, Holland, Germany, U.S.A., etc. are made out of nux vomica which is abundant in India. The nux vomica is the seed of the *Strychnos Nux Vomica*, a tree indigenous to most parts of India. Kuchila is the popular vernacular equivalent which will be understood in the different provinces of India but it is called Kajra in Bombay, Musidi in Telugu and Etti in Tamil.

This is a moderate-sized deciduous tree about 40 feet in height and found throughout the tropical part of India up to the altitude of 4000 ft. especially in the Gorakhpur Forests of Northern India, Bengal, Orissa, the Circars, the Deccan and the Carnatak; moist forests in the Bombay Presidency and deciduous forests of Ceylon. It is most plentiful in the Madras and in Tenasserim. So this industry can be taken up by anyone living anywhere as the raw material is found in almost all the provinces of India.

The fruit of this tree is a large round berry, one inch to two inches in diameter and inside it there are one to five seeds laid flat. The seed is disc-shaped rather less than one inch in diameter and about $1\frac{1}{4}$ inch in thickness slightly depressed towards the centre. The Madras variety has a round margin. You will now understand from this that the product naturally has the shape of the button and the artisan has no difficulty to bring it

to shape. The external surface of the seed is of a greenish grey colour and satiny appearance due to a coating of suppressed silky hairs. The interior of the seed consists chiefly of horny albumen which is easily divided into two halves. Each half makes a button. Sufficiently dried ripe seeds make hard good buttons.

The discs are turned on a lathe for shape. The holes, of which there may be two or four for attaching the button to the garment, are drilled while the button is in the lathe by means of four long drills converging toward the button forming all the holes at once. Generally two sizes of buttons are made, one $\frac{3}{4}$ inch diameter for the body and the other $\frac{1}{2}$ inch diameter for the hand. Then these are dyed.

Dyeing is the most important and painstaking process in the art of button-making requiring much attention to make them attractive. Nut buttons are dyed best with the basic colours using a bath at 120 dg to 140 dg F. containing a small amount of acetic acid. These colours exhaust well at the low temperature and the material is not affected. Acid dyes may also be used but as these require a boiling bath, it is disadvantageous for they usually cause the button to become softened and mis-shaped. Fur dyes are used for solid shades of brown and various other colours. The buttons are mordanted with bluestone, copperas, or chrome by soaking the goods in a solution of 4 to 6 ozs. of the mordanting salt in 10 gallons of water. This is started hot and allowed to cool down in the liquor for 8 to 10 hours during night time. Then rinse well in cold water

and dye in a solution of 1 to 6 ozs. of the dye per 10 gallons, starting at the boil and allowed to cool down by the liquor. Then add hydrogen peroxide to the extent of about 12 times the weight of dyestuff used and then leave in the solution until the shade is completely developed which will usually require about six hours. Blacks and dark browns are frequently produced by staining the buttons with a solution of silver nitrate and allowing to oxidise. Frequently stir up the buttons during the dyeing process. After dyeing wash well in water and then in a weak soap solution. Fur dyes used in this process are:-

Meta-phenylene-diamine

Para-phenylene-diamine

Amino-phenol etc.

used either alone or in mixtures.

Get your name and address or only "Superior Quality Nut Buttons," printed, protecting your manufacture by a trade mark of your own as you like on thin card boards just to the size of the imported ones and stitch 2 dozen of one-sized and same coloured buttons to a card and place six such cards in a card-board box. It will be most important to advertise that they are of Indian make. One person can turn, polish and finish about 300 buttons a day. In the beginning only plain dyeing is to be started and gradually striped ones can be undertaken after gaining some experience.

NEW PRIZES FOR VOL. XVII.

The Editor of INDUSTRY invites its subscribers to compete for the following prizes offered for the ensuing Session.

I. New Ideas for Small Capitalists.

We offer 5 Prizes of Rs. 5 each for ideas which can be successfully adopted by a young man with capital up to Rs. 500 only in his pocket to earn a decent livelihood. Schemes for starting small industries will be welcome but stress will be laid on their practical adaptability which will influence decision.

II. Suggestions for Self-Supporting Students.

We offer 5 Prizes of Rs. 5 each for suggestions which can be easily carried

out by students who follow the principle of earning while learning and must enable them to defray their expenses, at least. The practical nature of the suggestions will be taken into consideration in awarding the Prizes.

III. Occupation for Purdahnasin Ladies.

We offer 5 Prizes of Rs. 5 each for details of useful domestic industries which can be worked by the female members of a family in their spare hours. Special opportunities may be pointed out how a helpless widow can earn a decent living for herself.

IV. Village Manufactures.

We offer 5 Prizes of Rs. 20 each for informative articles on our cottage industries. These articles should give complete synopsis of all the existing arts and crafts of India, their present condition of development, raw materials used, methods and procedure, market for products, names and addresses of persons engaged, their economic condition, lines of improvement, etc. accompanied by sketches and photos of the improvement and of tools employed, if possible.

Rules for Competition.

1. Only subscribers to INDUSTRY are eligible for the Prizes.

2. The Editor's decision will be final and he will be at liberty to publish any communication in any way he likes. The names of successful candidates will be published in the first issue of the next volume.

3. The Editor will not be responsible for loss of or damage to any correspondence, neither will he remain bound to return any Manuscript.

4. The Editor cannot enter into any controversy regarding unused or rejected Manuscript. But in case requisite stamps are enclosed every endeavour will be made to send them back.

3. The Ideas, Suggestions and Articles for the separate sections noted above must be written on one side only on separate sheets of paper and addressed to—

The Competition Editor, **Industry**.

Small Trades & Recipes.

Flux For Enamel.

	By Parts.
White lead	10
Ball Clay	1
Flint Glass	10
Whiting	1

The flux is spread on the plate as a powder with a little gum.

(2)

Another recipe for flux is: -

Borax	3.
Red Lead	3.
Flint	2.
Run down.	

Egg Syrup.

This is prepared by beating the yolks and whites of 1 pound of eggs with the same volume of water, until the mass is sufficiently fluid to allow of it being strained through a cloth. What has passed through is then beaten to a froth, and 1½ pounds of pulverized sugar are added to it, and then 20 drops of orange-blossom water. In order to make it keep better it is advisable to add ½ ounce of common salt. The mixture is thoroughly stirred for 15 minutes, and when it is quite fluid the scum is removed and the syrup filled into 4 oz. bottles. When used it is mixed with 10 times its volume of water.

Furniture Polish

The following recipe for furniture polish will yield a product suitable for household use.

Melt 3 or 4 pieces of sandarac, each of the size of a walnut, add 1 pt. of boiled oil, and boil together for one hour. While cooking add 1 dr. of venice turpentine and if too thick, a little oil of turpentine too. Apply this all over the furniture, and after some hours rub it off; rub the

furniture daily without applying fresh varnish, except about once in two months.

Luminous Paint.

Calcium oxide	20.
Sulphur	6.
Starch	2.
Bismuth nitrate	1.
Potassium chloride	0.15.
Sodium chloride	0.15.

The burnt lime should be free from iron. The bismuth nitrate should be in 0.5 per cent. solution. The materials are mixed, dried, and heated to 1300 deg. C. The product gives a violet light.

Inks For Marking Packages.

Logwood Extract	18 oz.
Copper Sulphate	36 oz.
Gum Arabic	4 oz.
Water	3 gal.
Boil together for half an hour and add to the decoction	
Potassium bichromate	3 oz.

Shoe Polish.

	By Parts.
Yellow wax	10.
Oil of turpentine	1.
Potash	2
Melt these ingredients together and treat with	

	By Parts.
Molasses	2.
Water	100.
Stir the resulting mass with enough lamp-black to colour it deep black.	

Rat Poison.

Arsenic	1 oz.
Powdered Biscuit	1 oz.
Ultramarine	10 gr.
Oil of aniseed	2 drops.

INDIA'S INDUSTRIAL PROGRESS.

Cotton Growing in Ceylon.

Under the fostering care of the Department of Agriculture, and assisted by the results of scientific researches a potential cotton industry has sprung into existence in the south of Ceylon. Within a comparatively brief period, two thousand acres of land in the area around Hambantola have been established in this crop and it is estimated that during the next year a further five hundred acres will be under cotton. This, in itself, is convincing testimony that the product has found favour with the agricultural population. From the success that has attended the cultivation of cotton in Ceylon hitherto it would not be too much to hope that within a measurable period, Ceylon, with its abounding natural resources, will be numbered among the cotton-producing countries.

Chemical Industry in India.

What is really the first Chemical Works in India dealing with the by-products of salt on a large scale has been started in Kathiawar in the State of Dhragandra. The works will cost about Rs. 50 lakhs. In undertaking a concern of this nature the State collected all the information necessary and consulted the best experts. The resources of raw material in the State are ample and good prospects of the industries are assured.

Handloom Weaving in Madras.

Under the guidance of the Principal of the Government Textile Institute the

peripatetic weaving parties arranged a number of visits with the object of demonstrating the departmental hand sizing machines, the distribution of power-sized warp and the development of sericultural operations in the districts. According to the Report of the Department of Industries for 1924-25, the peripatetic weaving parties worked with their centres at Vizagapatam, Godavari, Kristna, Guntur, Bellary, Kurnool, Salem, Malabar, Madura and Madras. The practical working of the hand-driven sizing machine was demonstrated at Uravakonda, Chirala, Mangalore, Cannore, etc., while a number of weavers' beams were introduced on country looms.

Wealth of Bihar.

It has been said that the province of Bihar and Orissa may be backward in many respects but certainly not in mineral resources. Bihar produces nearly 70 per cent. of the all-India output of coal; 95 per cent. of its iron, and 93 per cent. of its mica; its limestone and dolomite keeps the iron furnaces going, while manganese and copper are developing. Judging by place-names, the province must, at some historical time, have produced gold and diamonds, but those happy days seem to be gone. Nevertheless there is yet much solid stuff left. Bihar and Orissa thus owns or is interested in mineral rights in a marked degree, and the Geological Department should look for further revelation of mineral wealth.

SCIENTIFIC AND TECHNICAL TOPICS.

Star Maps.

With the naked eye it is possible to see only about 7,000 stars, but from 20,000 photographs of the heavens taken during the last thirty years the correct positions of 50,000,000 stars have been ascertained. Enormous as this number is, the powerful telescopes in use to-day have led to the discovery of over 100,000,000.

Machine with a Brain.

Machines for automatically filling, sealing, and labelling bottles and jars which work with an almost uncanny speed and accuracy have recently been developed in America.

One machine which has just been placed on the market has a capacity of 120 filled and sealed bottles per minute. It not only fills each container exactly to a predetermined height, but also automatically skips and refuses to fill bottles that are badly cracked or otherwise damaged.

This machine will fill bottles with any liquid or semi-liquid, such as syrups, and sauces.

Filled bottles are passed to a mechanism which seals them hermetically with a new type of cap which can easily be removed by hand, without the use of troublesome cork-screws, openers, or tools of any kind.

The most fascinating part of this nimble-fingered machine is the labelling mechanism, which picks up a label from a holder, moistens it, places it accurately around the bottle or jar, and then wipes it clean and dry. The whole operation of filling, sealing, and labelling is continuous, and carried out at an amazing speed.

Seeing Through Steel.

The new method of making sheets of metal of unprecedented thinness, invented by a German Scientist seems likely to prove of considerable industrial as well as scientific importance.

He has succeeded in producing sheets of steel so thin that they are as transparent as the clearest glass. Atoms will pass through them without impediment.

Alpha rays from radium, completely blocked by a sheet of paper, are not perceptibly weakened in passing through such metal sheets. It is calculated from the specific gravity of the metal that these sheets are not more than thirty layers of atoms in thickness.

Wireless Pictures For All?

A Machine, as simple to operate as a gramophone, has opened a new era in wireless. It is the invention of an English scientist and will enable pictures be broadcast. The machine consists of a wireless transmitter with an attach-

ment similar to the cylinder-holder of old-fashioned phonographs. Instead of the wax record there is a thin sheet of copper on which the photograph to be transmitted is engraved.

The receiving set is the same as that used for loud speakers, with the exception of the horn, which is replaced by another cylinder bearing a sheet of sensitized paper.

Until a system of broadcasting pictures is arranged only people with transmitting licences will be able to use the apparatus, but for short-distance transmissions, such as across a room, no licence will be necessary.

There will be no difficulty in transmitting pictures hundreds of miles for although pictures have not been actually transmitted from Manchester, recording signals have been received in London perfectly on the machines. Twenty-five of the instruments have been made and others will soon be available at no greater costs than that of an ordinary loud speaker with one or two valves.

All the transmitter has to do is to put a picture or drawing into his instrument and switch on the "juice". The receiver will record it without trouble. At the moment pictures can be received by owners of one-valve sets, but crystal-set users will shortly be able to receive them as well.

Vegetable Surgery.

One of the latest applications of engineering to the preservation of old diseased, or damaged trees is the science of tree surgery. There are now a number of professional tree doctors.

Perhaps the most curious part of the business is what may be called tree dentistry. This applies to the filling of old cavities and the covering of the wounds caused by a crack or the common operation of "bracing" a tree with iron bands.

A tree that has any part of its interior exposed to the atmosphere is in the same situation, as a tooth having a hole through which impurities can penetrate to the soft living tissue and cause decay. In the case of the tooth the remedy lies in excluding agents of decay by means of an appropriate filling; with the tree, the tree surgeon fills all cavities that constitute exposures—with concrete!

The tree surgeon further imitates the dentist in ridding the cavity of all decayed matter before he puts in his plug. He cuts back until he comes to live, healthy tissue. An antiseptic dressing is applied, and then the tree dentist puts in his cement.

In large cavities the concrete is inserted in sections to ensure an elasticity that will permit the tree to sway naturally. These slight breaks also prevent too great a stress being set up, as this might cause the whole limb to snap in a severe gale.

When the filling is properly done, the tree shows a tendency to spread across the joint between wood and concrete, and gradually cover the space with bark. In cases where the cavity is small, it is not unusual for the surrounding bark to grow all over the filled space. So, in tree surgery, concrete takes the place of vulcanite or other material for fillings, and iron rods and cables represent the gold bands sometimes used in human dentistry.

FORMULAS, PROCESSES & ANSWER.

Castor Oil Mixture.

2568 B. W., Benares.—Requires the recipe for castor oil mixture for medicinal purposes.

Castor Oil ; 375 millilitres

Gum acacia, in powder 100 gramme.

Orange-flower water of commerce, undiluted 150 millilitres.

Cinnamon water sufficient to produce 1000 millilitres.

Triturate the castor oil with the gum acacia in a dry mortar; add, in one portion, two hundred millilitres of cinnamon water, and continue the trituration until the oil is completely emulsified; then with constant trituration add the orange-flower water and sufficient cinnamon water to produce the required volume.

Sugar Candy.

2823 M. B., Chittagong.—Asks how sugar candy is prepared.

Sugar candy is prepared from a saturated solution of sugar, formed by adding sugar to boiling water till it dissolves no more. The solution is then run into troughs, in which it is allowed to cool slowly, while a number of threads are hung in the liquid upon which the crystals form, and continue to grow. The time required will depend on the bulk of sugar treated. In working on a small scale, it will be necessary to remove the strings and adhering crystals; then add more sugar to the liquid, boil up, and immerse the strings again

while the liquid is cooling. Cakes of candy will also separate on the sides of the vessel in which the liquid cools.

About Cleaning Glass.

2193, S. A. G., Rangoon.—Asks how dimmed eye glasses can be cleaned.

In the first place, a glass surface is very seriously affected by the minute film of organic matter which is left upon it when it has been touched with even a clean finger; unless the glass is of the best quality in this respect such finger marks readily develop into indecent pots and may even turn into black stains. Particles of dust allowed to settle on the surface of the glass will affect it in the same way, so that the protection afforded by mere mechanical enclosure in the tube of an instrument is of decided value in preserving a glass surface. It should, however, be noted that in some instances the interior metal surface of optical instruments are varnished with substances that give off vapours for a long time after the instrument is completed, and in that case the inside lenses are apt to be tarnished in consequence. On the other hand, outside lenses are also exposed to direct mechanical injury from handling and "cleaning." As far as the latter operation is concerned, it frequently happens, particularly in glasses containing soda, that a slight surface dimming is formed on the glass when it has been left in a more or less

damp place for a long time. This dimming is chiefly due to the formation on the surface of a great number of very minute crystals of carbonate of soda which are hard and sharp enough to scratch the glass itself if rubbed about over it. If such a lens be wiped with a dry cloth however clean and soft, the effect is a permanent injury to the polished surface, which would readily be avoided by first washing the lens with clean water; or even by using a wet cloth instead of a dry one for the first wiping.

Formic and Acetic Acids.

2954, T. U. F., Kalutara South.—Wants to prepare formic and acetic acids.

Formic acid is formed by the dry distillation of starch, sugar, gum, tartaric and oxalic acids, etc. It is best obtained by heating a mixture of glycerol with crystallised oxalic acid. The anhydrous glycerol is heated with the oxalic acid to 75 degree to 90 degree until the evolution of carbon dioxide ceases, when a fresh quantity of oxalic acid is added; and the process repeated. The oxalic acid decomposed into water, carbon dioxide, and formic acid, which re-acts upon the glycerol, forming monoformin.

On the addition of a further quantity of crystallised oxalic acid, the water of crystallisation decomposes the monoformin producing glycerol and formic acid which distills over.

Acetic acid is produced by the oxidation, decomposition and destructive distillation of many organic bodies. The greater part of that used in commerce

is obtained by the destructive distillation of wood.

Alcohol may be converted into acetic acid by powerful oxidising agents, such as chromic acid, nitric acid, etc. Advantage may be taken of the fact that spongy platinum or platinum black has the property of absorbing oxygen and thus acting as a powerful oxidising agent. If spongy platinum be placed over a vessel of alcohol with free access of air, the platinum absorbs at the same time the oxygen and the alcohol vapour, which combine and produce acetic acid and water.

The concentrated or glacial acetic acid is usually prepared by the distillation of a dry acetate with an equivalent quantity of strong sulphuric acid, or acid potassium sodium sulphate.

Properties Of Rubber Latex.

The same gentle man wishes to be enlightened on the properties of rubber latex.

Under ordinary conditions latex, as obtained by tapping presents the appearance of a white liquid, having about the same consistency as cow's milk, more or less thick according to the amount of rubber it contains, which depends upon the height above the ground at which the latter was taken from the tree, and upon the age of the latter. This latex stains the hands black, and when left exposed to the air develops an odour of methylamine. Its density varies according to the amount of rubber it contains, and the richest latex is that with the lowest specific gravity.

Since latex is composed essentially of two different portions, a colloid-rubber, and a serum, it possesses the characteristics of a colloidal solution, or sol, and its investigation becomes of a particularly delicate character.

Cleaning Paintings.

3078, R. K. D., Vansaved,—Asks how paintings can be cleaned.

To clean an oil painting, take it out of its frame, lay a piece of cloth, moistened with rain water, on it, and leave it for a while to take up the dirt from the picture: several applications may be required to secure a perfect result. Then wipe the picture very gently with a tuft of cotton wool damped with absolutely pure linseed oil. Gold frame may be cleaned with a freshly cut onion; it should be wiped with a soft sponge wetted with rain water, a few hours after the application of the onion, and must finally be wiped with a soft rag. It is advisable however to seek the assistance of an expert as valuable paintings may be damaged by inexperienced handling.

Casting Small Lead Toys.

3072, N. G., Bombay.—Wants to learn the process of casting small lead toys.

Small castings in lead such as toy soldiers, fly wheels, etc., can be conveniently cast in a plaster of paris mould. A wooden box is partially filled with plaster of paris and while still soft press the pattern of the article it is required to mould into it so that half its thickness is embedded. The pattern should be

coated with shellac prior to insertion in the plaster of paris, to facilitate its removal. When the mould has thoroughly set, remove the pattern and coat the surface of the mould and the impression with shellac, also wrapping a layer of oiled paper round the bolts. Now replace the pattern in the mould, fill the box with plaster of paris, and allow it to set.

In order to provide an inlet or sprue hole for the molten lead, while the plaster is still plastic push a taper wooden plug in so that its point touches the pattern. The wooden plug, similarly to the pattern requires to be covered with shellac to ensure its easy removal from the plaster when the latter is hard. When it is so, remove the top portion of the mould and brush a coat of shellac on the impression side of it, brushing neatly into the latter.

In using the mould, it is merely necessary to clamp the top portion down by the wing-nuts and pour in the lead. Make quite certain that the mould is dry, otherwise the lead may splash.

Removing Ink Stains.

2810, A. L. B. S., Surat.—Wants to know the process of removing ink stains.

Oxalic acid which is often used for removing ink stains from clothes attacks the fibre of the texture. Instead therefore prepare a mixture of 2 parts of tartar and 1 of powdered alum. This does not injure the clothes; it may also be used for removing other stains. Ink stains may be removed from silk by the following method. Moisten the stain with strong white wine together and rub

some warm beechwood ashes upon it, and finally wash with soap water.

Louse Killers.

2141, J. A. D. S., Goa.—Wants a good formula of louse killer.

Various applications have been recommended for the destruction of these loathsome parasites; amongst which we may mention sulphur, staves-acre, white precipitate and coccus indicus, in the form of ointments; carbolic acid and perchloride of mercury lotions and tobacco. Benzoic acid has been found of service in allaying the irritation. Diligent washing with soap and water should be had recourse to previous to applying any of the above remedies, and should the head be infested, the hair should be cut short, and frequently combed with a small-tooth comb.

Liquor Bismuthi et Ammonii Citratis.

2676 H. C., Calcutta.—Asks how to make up Liquor Bismuthi et Ammonii Citratis.

To prepare solution of Bismuth and Ammonium Citrate take:—

Bismuth Oxynitrate	70 grms.
Citric Acid	52 grms.
Solution of Ammonia	q. s.
Distilled Water	q. s.

Powder the citric acid and mix it in a mortar with the bismuth oxynitrate and twenty millilitres of distilled water. Allow the mixture to stand, with occasional stirring, for half an hour, or until a small portion is completely soluble in solution of ammonia. Transfer to a beaker, using four hundred millilitres of

distilled water to rinse the mortar. Allow the precipitate to settle, remove the clear liquid by decantation, and wash the precipitate with three successive quantities, each of four hundred millilitres, of distilled water. Add to the washed precipitate, while moist, just sufficient solution of ammonia to dissolve it, and then add sufficient distilled water to produce one thousand millilitres of the solution.

Cologne Water.

1673 D. F. C., Allahabad.—Wants a recipe of Cologne water and tooth paste.

Oil of Lavender	1 fl. oz.
Oil of Bergamot	1 fl. oz.
Oil of Lemon	1 fl. oz.
Oil of Neroli	1 fl. oz.
Oil of Cinnamon	$\frac{1}{2}$ fl. oz.
Oil of Rosemary	$\frac{1}{2}$ fl. oz.
Rectified Spirit	9 pints.

Tooth Paste.

A good antiseptic tooth paste is prepared by triturating 30 grams of formalin with 1000 grams of purest levigated chalk, then adding 200 grams of powdered violet root, 50 grams of magnesium carbonate, 100 grams of soap powder, 10 grams of peppermint oil, 2 grams of bergamot oil, and 1 gram of citronella oil, the whole being then mixed up to form a paste with about 100 grams of chemically pure glycerine.

Paint Remover.

2554, M. A. A., Krishna.—Wants a recipe of paint remover.

Dissolve 2 oz. washing soda in a little water and mix with about 2 lb. soft soap. It should be spread over the paint

for about 24 hours and then washed with hot water.

Rose Powder.

1372, G. T. R., Dehra-Dun.—Desires to manufacture rose powder.

Starch	1 kilo gram
Carminc	2 gram.
Rose Oil	1½ „
Santal Oil	1½ „
Vetivert Oil	1 „

The Rennet and its Preparation.

3263 P. V. R. R., Akidu.—Writes please let me know everything about rennet and its preparation.

Rennet is an enzyme produced in the stomachs of mammals; it occurs in the human stomach, and the curdlings of milk when indigested is due to this; it is especially abundant in the young while still suckling.

Rennet is usually prepared from the fourth stomach of the calf. The stomachs are dried and kept for some time; they are then cut up into small pieces and macerated in a 5 per cent. solution, usually containing boric acid, for some days, to the solution a further 5 per cent. of salt is added, and the liquid filtered; this forms extract of rennet. By adding more salt the rennet is precipitated, and "rennet powder" is produced; this consists, essentially, of the ferment, together with other organic matter, and a considerable amount of salt.

Rennet acts on casein only in neutral or acid solution, and its properties are destroyed by alkalies. Like all enzymes it

has an optimum temperature at which it acts best. The action of rennet is affected by the acidity of the milk. By beating milk the action of rennet is delayed. Alkalies destroy the power of rennet to curdle milk; borax acts as an alkali. By heating rennet to temperatures much above 60 degree C it loses its properties rapidly, and it also loses strength by long keeping.

Bleaching Yarn.

3410 G. G. R., Masulipatam.—Wants a process of bleaching yarn.

For the bleaching of yarn a complicated process is necessary. The principal operations are:—Boiling in caustic soda or soda ash; bleaching in chloride of lime, souring in hydrochloric or sulphuric acid; and, lastly, for white yarn, washing and blueing. This is, in principle, the method adopted in nearly all bleaching processes. The harder the twist the more difficult is the yarn to bleach, and with hard spun yarns it is necessary to repeat some of the operations.

For small lots the following process gives good results:—Boil two to three

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hours with caustic soda of 2 degree Tw. and 2 per cent. soap; wash, steep for one to two hours in chloride of lime at 1 degree Tw.; wash and sour in hydrochloric acid at 2 degree Tw; steep one hour, wash and soap. The final washing of the yarn must be carefully effected in order to eliminate the last traces of acid, which, if left in, would cause tendering.

Pyrogallic Acid.

3351 L. S., Dewas Senior.—Asks how pyrogallic acid is prepared.

If gallic acid is carefully, heated to about 400 degree it is totally decomposed into carbonic acid and pyrogallic acid which sublimes in brilliant white plates; it is easily soluble in ether, alcohol, and water; it re-acts feebly acid, it fuses at 240 degree and sublimes at 400 degree. If a solution containing peroxide of iron be added to a solution of pyrogallic acid, a black colour is struck, but the iron is rapidly reduced to a state of protoxide, and the liquor assumes a rich red tint.

Castor Oil Soap.

3391 C. C. S., Wadhwan City.—Wants to learn the properties of castor oil soap.

Castor oil yields a very soluble soap with caustic soda and is easily saponified. By careful treatment a liquid soap may be obtained which at one time was largely used by dyers and cotton finishers under the name of soluble oil; castor oil soap is very clear and transparent, therefore it is used in preparing the cheaper kinds of transparent soaps, but being also very soluble in water such soaps are extremely wasteful in use, and while this may

be a good thing for the soap-maker it is not for the soap user.

Castor oil soap has often a faint odour of the oil and is liable to become rancid in keeping. It yields a good soft soap, but is not much used for this purpose. It requires from 17.5 to 18 per cent. of caustic potash, or 12.5 to 13 per cent. of caustic soda to saponify it, rather less than the majority of fats and oils; a stronger lye, from 15 to 18 degree Tw; can be used, and it is easily boiled up and lends itself to the cold process of soap making with great facility.

Liquid Pearl White.

3291 F. C., Bezwada.—Wants a recipe for pearl cream for theatrical purposes.

Rose water	1 litre.
Orange flower water	1 litre.
Basic bismuth nitrate	500 grams.

Mix well and allow to stand. The nitrate will settle down completely, leaving the supernatant liquid quite clear. Therefore give instruction to shake up the preparation before use.



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SPORTING GOODS
Silver Medals, Cups & Shields.

Fine Silver Medals in
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Rs. 3-12 each.

Largest Stock & Variety
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31D, Chowringhee, Calcutta.

BRIEF QUERIES AND REPLIES.

Questions of any kind within the scope of **Industry** are invited. Enquiries or replies from experts will be published free of charge. Questions are not generally replied by post.]



3123 R. N. R., Bellary—Chlorine and sulphur dioxide are used for bleaching cotton piece-goods and hosiery goods

3136 S. M., Cawnpore—Recipes of toilet preparations will be found in September 1924 issue. There is no depilatory known to us which removes hair permanently. Refer your other queries to a physician.

3137 M. N. V., Lahore—Indian films are produced by Pathe Cinema Ltd., Pathe Bldg., Ballard Estate, Bombay and J. F. Madan & Co. Ltd., Tara Chand Dutt Street, Calcutta.

3138 W. C., Daltonganj—It is very difficult to say the exactitude of a mineral without chemically analysing it. For analysis you may try Dr. B. Ghosh, 5 Cooper's Lane, Calcutta. Your other queries are in the nature of an advertisement hence these should not be published in these columns. Wants a capitalist to invest in profitable mining business.

3139 P. M. O. T., Trichinopoly—It is not our custom to put reviews or notices of the same article or book twice.

3140 I. F. N. C., Moga—Reply to your enquiries appeared in the last issue under No. 3062 and No. 3057.

3142 J. D. V., Meerut—The addl. firms referred to by you, as far as we know, are correct.

3145 Q. S. C., Madras.—For small oil extracting machines write to T. E. Thomson & Co., 9 Esplanade East, Calcutta.

3146 S. E., Bombay—Wants full address of Le Metegore Fountain Pen Manufacturing Co., of Paris, France.

3147 R. S., Secunderabad.—For industrial books enquire of Book Co., 4/4A, College Square, Calcutta.

3148 M. M. L., Rawalpindi.—Write direct to the firm enquiring whether they have any branch office in India. For books on wireless

telegraphy enquire of Thacker Spink & Co., 3 Esplanade East, Calcutta.

3149 A. T. C., Sukkur.—You may use camphor and menthol for perfuming both tooth powder and ointment.

3150 D. N. R., Chicacole—Picture post cards may be supplied by Tuck Raphael & Sons Ltd., Raphael House, Moorfields, London E. C2. P. Racine & Cie, Boul. Sebastopol 96, Paris, France. Optical goods may be supplied by American Optical Co. Ltd., Hatten Garden, London E. C1; Key Lens Optical Co. Ltd., Exchange Station, Tithebarn Street, Liverpool, England, and Kirmse Edmund, New market 3, Leipzig, Germany.

3151 P. G., Golmuri—Reply to your queries appeared in February issue under No. 2736.

3152 J. I. D., Bangalore.—Reply to your queries appeared in February issue under No. 2936.

3153 A. S. A. H. C., Cochin.—Paints are manufactured by Beigal Paint & Varnish Works Ltd., 24 Howrah and Pioneer Indian Paint & Oil Works, Ltd., near Byculla Bridge, Byculla, Bombay. The following are some of the paper mills: Bengal Paper Mill Co. Ltd., 103 Clive Street, Calcutta; Titaghur Paper Mills Co. Ltd., Chartered Bank Bldg., Clive Street, Calcutta; Girgaon Paper Mills, 77-79 Apollo Street, Bombay; Deccan Paper Mills Co. Ltd., 561 Bhawani Pet, Poona; Meenakshi Paper Mills Co., Punalur, Travancore; Upper India Couper Paper Mills Co. Ltd., Lucknow and Mahamedbhai Jamaluddin Paper Mill, Surah Gate, Surat. Stationery goods are manufactured by Dass & Co., 60 Sikdar Bagan Street, Calcutta and Bengal Miscellany Ltd., 99 Manicktolla Main Road, Calcutta. Foreign addresses appear occasionally in these columns.

3154 R. P., Chowkhandi.—For surveying instruments enquire of Thacker Spink & Co., 3 Esplanade East, Calcutta. For tacks used in shirts, coats etc. enquire of E. B. Bros.

Co., 11 Dharamtala Street, Calcutta.

3155 S. M. R., Ahmedabad.—It would be advisable for you to procure tea from big tea merchants of Calcutta. Tea may be bought of Bhattacharya & Co. Ltd, 1 Swallow Lane, A. M. Esmail, 9 Weston Street; Lyall Marshall & Co., 25 Mangoe Lane, Oriental Tea Supply Co., 3-1 Mangoe Lane and S. Banerjee & Co Ltd., 7 Swallow Lane; all of Calcutta. Coffee may be had of R. K. Motishow & Co., 11 Hummum Street, Fort, Bombay; Sutaria Kothari & Co., Hummum, Street, Fort, Bombay and C. R. Bright & Co., 136 Broadway, Madras.

3156 M. S. A, Madras.—For prospects and possibilities of match industry you are referred to July 1922 issue of **Industry**. Match machines may be bought of Bengal Small Industries Co., 91 Durga Charan Mitter Street, Calcutta.

3157 M. S, Bilimora.—For the machines required write to Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

3158 B. B. C, Talup.—Looking glasses may be supplied by Behary Lall Dey, 14, 15 & 16 Swallow Lane and Fotic Lall Seal & Sons, 16 Swallow Lane; both of Calcutta. Reply to your other queries appeared in January issue under No. 2667.

3160 M. R. B. B, Shillong.—Process of making turmeric marketable appeared in April 1924 issue. Dry red pepper in the sun. For preparing "atta" use flour making machines which may be supplied by T. E. Thomson & Co Ltd., 9 Esplanade East, Calcutta. Straws may be utilised in making straw-board.

3162 K. V., Tenali.—Detailed information regarding match industry including recipes, etc, will be found in July 1922 and September 1923 issues of **Industry**. Castor oil may be prepared in oil extracting machines which may be supplied by Burn & Co., Hongkong House, Council House Street, Calcutta and Marshall Sons & Co. Ltd., 9 Clive Street, Calcutta who will supply you all the necessary information and literature. An article on vegetable oil extraction appeared in June 1925 issue.

3163 L. C., Ahmedabad.—Confectionery

machines may be bought of Seth Deepchand & Sons, Old Sukkur, Sindh. Tin box manufacturing machines may be indented by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta on your behalf. French chalk is available at paint shop. Washing soda is mainly prepared from sodium sulphate.

3164 B. P., Rewari.—Paper cutting machines may be supplied by John Dickinson & Co., Mercantile Bldg, 1 Bentinck Street, Calcutta. Secondhand printing machines may be had of A. Lall & Son, 15 Balaram Bose's 2nd. Lane, Bhawanipur, Calcutta.

3165 S. B. H. R., Patna City.—To communicate with any querist write him with number and initials under care of **Industry** when your letter will be duly redirected.

3166 O. S. B, Mayavaram.—Gum of all sorts may be bought of Banshidhar Dutt & Sons, 126 Khengtaputty, Bara Bazar and Madhab Ch Daw, 4 Armenian Street; both of Calcutta. Chemicals and essential oils may be bought of B. K. Paul & Co, 1-3 Bonfields Lane, Calcutta.

3167 K. H. S, Bikaner.—Betel nut cutting machines may be supplied by Medland Bose & Co., 13/1 Old Court House Street, Calcutta. Yes, you may start strike-any-where match industry in Bikaner. German novelties have still wide scope in India. Wishes to purchase bloodstone.

3168 J. G., Rajahmundry.—Methylene blue and other colours may be bought of Amin Chand Mehra & Sons, 34 Armenian Street, Calcutta. Reply to your other queries appeared in December issue under No. 2126.

3170 J. J. G., Puthur.—Refer your query to Bengal Chemical & Pharmaceutical Works Ltd., 15 College Square, Calcutta.

3172 A. K. A., Khajurha.—Informs our readers that sugar industry has every chance of success under proper direction.

3173 G. G. A., Goa.—Imitation pearl and precious stones are imported by M. Allabux & Co., Narsingha Mansion, Carnac Road; Gulab Chand Dev Chand, 46-48 Medows Street, Fort, and Jewellers Ltd., Waterloo Mansion, Fort;

all of Bombay. Cardboard boxes may be had of Card-board Manufacturing Co., Angres Wadi and Ruttonji Shapurji Tata & Co., 78-82 Vadgadi Mandir; both of Bombay. For starting business with small capital go through the New Idea columns of *Industry*. Attars of various sorts may be supplied by Paradise Perfumery House, 75 Colootola Street, and Sickri & Co., 58½ Canning Street; both of Calcutta. 'Khadi' is a kind of cloth woven with hand-spun yarn. Recipes of agarbatties will be found in May 1924 issue.

3174 M. P., Madhubani.—You may go through *Rubber*. Its sources, cultivation and Preparation by Mr. Harold Brown to be had of Thacker Spink & Co., 3 Esplanade East, Calcutta.

3175 B. R. N., Alwar.—You may write direct to the company enquiring whether they have any agent in India.

3176 R. L. N. S., Bikkavole.—Refer your query regarding agriculture to the Director of Agriculture of your Province. For books on Latin and Greek enquire of Book Co., 4¼A, College Square; Chackraverty Chatterjee & Co. Ltd., 15 College Square, and Thacker Spink & Co., 3 Esplanade East; all of Calcutta.

3179 A. S., Lashio.—Law books may be bought of R. Cambray & Co., 15 College Square, Calcutta.

3180 N. D., Meerut.—You need not take any special permission from the local Government for hair oil manufacture.

3182 N. S., Ludhiana.—Twines may be bought of Gopal Chandra Das & Co., 9¼, Clive Street; Dey & Co., 4-B, Clive Street and Upendra Nath Dass & Bros., 74¼ Clive Street; all of Calcutta.

3184 W. C., Tirupati.—Optical goods may be supplied by Baliwala & Homi, Hornby Road; Marcks & Co. Ltd., 43 Esplanade Road and V. J. Powell & Co., 371 Hornby Road; all of Bombay. Foreign addresses of optical goods suppliers will be found elsewhere in these columns. Electrical goods may be supplied by Akberally Tajbhoy, 127 Janjiker Street, Khoka Bazar and Bombay Hardware & Electric Mart, 23 & 24 Elphinstone Circle, Fort; both

of Bombay. Fancy goods may be supplied by Ganapathy & Co., Khetwadi P.O. and Addison Framji & Sons, 4 Bruce Lane both of Bombay.

3186 M. Q. R. C., Dhanbad.—Small oil engines may be bought of Alfred Herbert Ltd., 13 British Indian Street and T. E. Thomson & Co., 9 Esplanade East; both of Calcutta. For disposing of fibres and bristles you may communicate with the following brush making concerns. H. Davis & Co., Cawnpore; Brushwares Ltd., 123½ Halsey Road, Cawnpore and Calcutta Brush & Fibre Co., 172 Bow Bazar Street, Calcutta. For fibre extracting machinery write to, Oriental Machinery Supply Agency Ltd., 20½ Lall Bazar Street, Calcutta.

3187 D. R. K. C., Colombo.—You may consult Thacker's Indian Directory to be had of Thacker Spink & Co., 3 Esplanade East, Calcutta.

3188 K. N. P. C., Kallal.—Articles on match industry appeared in July 1922 and September 1923 issues of *Industry*. If you go through those articles you will have a clear idea of the industry.

3189 M. A., Sargodha.—Electrical books may be bought of Book Co., 4¼A, College Square, Calcutta.

3190 S. A. R., Secunderabad.—Gas filling apparatuses may be had of A. R. Khan & Sons, Chanda, C. P. Write to the advertiser under care of *Industry* when your letter will be duly redirected.

3191 R. P. K., Sitapur.—You may go through Bengal Sweets by Mrs. J. Haldar to be had of Chackraverty Chatterjee & Co. Ltd., 15 College Square, Calcutta.

3192 K. L. N., Allagadda.—Refer to No. 3188 above.

LITERATURE
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357 Pages, Price Rs. 3. Postage Extra.

A comprehensive and Confidential Treatise. Every parent desiring to regulate the number of children according to his health and means will find it a God-send. Ask for table of detailed contents which will be sent free.

K. M. DAS & CO.,
29-1, Telepara, Sampooker St., Calcutta.

3193 N. D., Meerut.—Castor oil may be bought of Anath Nath De, 3 Moidaputty, Bara Bazar, Calcutta.

3194 S. P. B., Nagpur City.—For commercial books enquire of Kamala Book Depot, Ltd., 15 College Square, Calcutta.

3195 A. S. I. D., Moulmein.—Lead pencils of all descriptions may be bought of Nilmoney Halder & Sons, 106 Radha Bazar Street, Calcutta. Books on photography may be bought of Thacker Spink & Co., 3 Esplanade East, Calcutta. Neck-ties, socks, etc. may be supplied by E. B. Bros. & Co., 11 Dharamtala Street, Calcutta.

3197 K. C., Shekhpura.—Java sugar may be supplied by Osman Yusuf & Co., 8 Boomstraat, Sourabaya and Senda & Co., Heerenstraat Sourabaya; both of Java.

3198 A. R. V., Rajgangpur.—Small cinematograph machines may be bought of J. F. Madan & Co., Tara Chand Dutt Street, Calcutta.

3199 S. D. W., Mangalore.—You perhaps mean porcelain jars which may be supplied by Emil & Klinger Co., G. m. b. H., Koniggratzer Str. 55, Berlin S. W. 11. and Alfred Schneider & Co., Chemnitz S1; both of Germany. Beaten rice or 'chira' is prepared in Indian huskers. Cinnamon oil is used for medicinal purposes. For fibre machine refer to No. 3186.

3201 Y. S. N. R., Vizagapatam.—If you consult the Small Trades and Recipes section of **Industry** you will find hints for home industries, such as you want. For formulas of Hair Oil we would recommend to you the 'Manufacture of Hair Oils' published by this Office.

3202 M. K. J., Kurla.—It would be advisable to use some reliable hair tonic such as Jaborandi in case of falling hair. Also try rubbing onion juice. Genuine Macassar oil lengthens hair.

3204 S. N. R., Chapra.—We have got no book on company promoting but an exhaustive article on the subject appeared in the Commercial Supplement to **Industry**.

3206 E. T., Karwar.—Please consult Indian Tobacco and its Preparations published by this office

3207 I. U., Bangalore.—The following are addresses of type founders. (1) Gujrati Type Foundry, Gaiwadi, Girgaon. (2) Oriental Printing Works, Brindaban Basak Street, Garanhatta, Calcutta. (3) Swadeshi Type Foundry 42, Guruvappa Chetty Street, Chintadripet, Madras.

3208 G. D. S. C., Ahmedabad.—For oil milling plant we would refer you to Messrs. Burn & Co., Howrah, Calcutta.

3209 B. L. S. Jhind.—All the articles should be procured from the local market or from Jadu Nath Ghor, Hukaputty, Bara Bazar, Calcutta.

3210 P. A., Khetri.—Homeopathic medicines may be had of Parboty Homeo Hall, 54, Bartolla Street, Calcutta.

3211 D. R. S., Amritsar.—The addresses of calender manufacturing companies of the world could be found in Kelly's Directory. Some addresses have been published in the query section in the last issue of **Industry**. You shall have to advertise for the service of a good artist and designer.

3213 A. P. S., Walajapet.—Answer to your query has appeared under No. 2819 in February issue.

3216 B. R., Rawalpindi.—For typewriter on instalment system you are referred to G. Rogers & Co. Norton Bldgs., Calcutta.

3217 V. S. M., Madras.—The articles you mention may be had of Jadunath Ghar, Hukapatty, Bara Bazar, Calcutta. 1 tola is equal to the weight of a rupee from which you can deduce the other measures. The following are vernacular equivalents. Cloves—Kiramku; Aniseed—Kuppi; Cinnamon—Eringolam, Kurundu; Carraway—Zirdu, siah.

3218 M. K. C., Chittagong.—You shall have to make local enquiry for the process of Hazari Gur. The difference in the hot bath and cold bath processes of soap making is that while in the former the ingredients are boiled, in the latter they are treated in ordinary temperature. Tartaric acid may be made from tamarind. Good blocks may be made by Industry Process & Printing Dept.

3219 J. K. J. R. Tanjore.—Please consult: (1) Scientific American, New York; (2) Amateur Mechanic, 41 South Castle St. Liverpool; Industries Illustrated 43 & 44, New Bond St., London. Recipe on Mantle making appeared in February 1922 issue.

3220 V. P. S. C., Rajahmundry.—For installation of chemical plants please enquire of The Bengal Chemical & Pharmaceutical Works 15 College Sq; Calcutta.

3222 J. F. C. Castle Rock.—There is no objection to your christening your business provided similar name is not already used by any one else. For incubators please enquire of T. E. Thomson & Co. Esplanade, Calcutta. Theoretical knowledge in science will be of little avail unless it is applied in industry.

3225 A. N. V. N., Madura.—Adulteration of Camphor is not known.

3227 P. G. I., Tanjore.—Match machines may be had of our advertiser The Oriental Machinery Supply Agency, 20/1, Lall Bazar St. Calcutta. For match chemicals please enquire of The Oriental Industrial Co., College Street Market, Calcutta. Match sticks may be had of The Bande Mataram Match Factory, Tollygunge, Calcutta. Please enquire of Indian Story Teller, 164, Cornwallis St., Calcutta.

3231. I. C. L. Jagraon.—Your enquiry is in the nature of an advertisement, and therefore can not be published in the Trade Enquiry column.

3232 M. J. N. J., Almora.—For Derby sweep tickets and membership please enquire of The Secretary, Royal Calcutta Turf Club, 13, Russel St., Calcutta. Many of our advertisers sell novelty articles.

3233 L. C. C. Gujarkahn.—Your enquiries have already been replied.

SERVICEABLE GOODS.

High Class Ready Made Swadeshi Clothes.
Madras Tassar Coat Rs. 4/- and Rs. 3/-;
Suit Rs. 7/8 and Rs. 5/4; Twill Shirts Rs. 1/8;
Jaffer Shirts Rs. 1/6; Warm Frocks As. -12/-.
with order. We defy competition in Prices
and Artistic Cutting.

MAHINDRAKAR BROS.,
Bombay No. 4 or 12 & Poona City.

3234 P. D. K. P. Amritsar.—The things have been described at the end of the article. It may be had of Jadu Nath Ghor, Hukaputty, Bara Bazar, Calcutta.

3235 G. S., Kotah.—Your enquiries have already been replied.

3236 H. K. B. Kathiawar.—Wants glass tubes, hollow blades, etc., of Japan. Please enquire of Mitsui Bhusan Kaisha, 11, Clive Street, Calcutta.

3237 N. B. D., Nagpur.—For books on laundry please write to Chuckerverty Chatterjee & Co., 15, College Square, Calcutta.

3238 K., Najibabad.—You can learn everything on glass making if you go through a book on the subject to be had of Thacker Spink & Co., Esplanade, Calcutta.

3239 R. R. N., Lucknow.—You can get yourself admitted into any technical school like the School of Arts & Crafts at Lucknow.

3241 G. V., Badaur.—Wants to know the agent for Firestone Tyres in Calcutta.

3242 P. K. A., Kottayam.—We cannot advise you anything unless we see the sample of the bye-product. Do you refer to glycerine from spent lyes?

3243 K. B. R., Salur.—For the manufacture of hair oils you are referred to the book on the subject published by this office. Recipes of articles mentioned by you have appeared in these columns from time to time. You shall have to enquire of the local authorities whether any licence will be necessary.

3244 E. V. U., Travancore.—The following are some well-known trade journals. (1) The British Trade Review, 86, Cannon St., London, E. C. 4. (2) Commercial America, Philadelphia, U. S. A. (3) Ubersee Post, Leipzig, Germany.

3245 R. L. Gaya.—Many of our advertisers will be able to supply you the articles you want. Wants 'tal misri' (palmyra sugar candy) and Pindi Khejur (Dates).

3250 A. L. J., Jamnagar.—If you refer to the Emigration Officer, Delhi, most probably he will be able to help you. But the enquiry is outside our scope.

3252 M. G. S. C., Gaya.—If you wish to export Indian Produce you can advertise in the

pages of **Commercial India**. Wants Arabian horses and mares.

3255 B. G. D., Aden.—One minute cameras may be had of E. Solomon 3, Kenderdine Lane, Calcutta.

3258 K. C., Tirupati.—For securing agencies of foreign firms you shall have to write to them direct. Many addresses will be found in every issue of **Industry** in these columns.

3259 B. K. D., Multan.—Wants cotton seeds oil, palm kernel oil, soap nuts, etc.

3260 N. R. W., Akyab.—Can supply tins for packing tea, of any kind.

3262 P. V. R., Godavari.—Powders can be compressed to any desired form with the help of tablet making machine to be had of The Calcutta Industries Ltd., 136, Maniktala Main Road, Calcutta.

3264 J. L., Tundla.—Small ice-making machine may be had of Messrs. Burn & Co., Howrah, Calcutta.

3266 L. J. P., Hyderabad.—Soda water machines may be had of Little & Co., 3, Grant Lane, Calcutta. If you go through the article on Mineral Water Manufacture published in the January issue of **Industry**, you will learn everything.

3267 K. I. C., Tirumangalam.—Samples of handmade textile may be asked for from our advertisers direct. Weaving accessories may be had of Bros. Partners & Co., 35, Ezra St., Calcutta.

3268 S. P. W., Kurunegala.—Addresses of calendar manufacturers have appeared in these columns in the last issue of **Industry**. Consult Caxton Magazine, Avenue Chambers, Southampton Row, London, W. C. 1.

3269 G. M., Virudhunagar.—Your enquiry has been published in the February issue.

3270 W. C., Daltongunge.—The enquiry is outside our scope.

3271 K. V. A., Alleppey.—There appears to be no authoritative treatise on Biscuit Manufacture. But recipes are found in Bakery and Cookery books generally.

3272 N. D., Meerut.—Yes, it is very difficult to know all the names of hair oils, there are so many of them in the market. It is for you to devise a new name altogether.

3274 A. R. G., Mana.—You can have books lent out from both The Imperial Library, Esplanade, Calcutta, and The Commercial Library, 1, Council House Street, Calcutta.

3275 F. T. I. W., Rawalpindi.—Wants to indent coal tar from Germany, England and America. Try Surajmal Badridas, 8-1, Rup Chand Roy Street, Calcutta.

3276 Y. V. S., Tuni.—The address of Japanese bone setters is Mr. and Mrs. R. Touda, 18, Marquis Street, Calcutta.

3277 M. M. Traancore.—Wants to be introduced to Indian and foreign dealers in medicines. Wholesale importers, are Martin and Harris, 8, Watfloo St., Calcutta.

3278 R. P. W., Patna.—Your query has been replied in the February issue.

3280 V. G., Ceylon.—"Motor" published from New York is a monthly dealing with automobiles.

3281 P. S. N., Palai.—See 3277.

3283 T. L., Kirkee.—The address of the maker of Electric Stethoscopes is not available.

3284 N. K. M., Lucknow.—Electric fountain may be supplied by McLawrie & Co., 17, Ezra Street, Calcutta.

3287 J. J. W., Tirthahalli.—The chemicals you require may be had of B. K. Paul & Co., Bonfields Lane, Calcutta. Carpenter's tools may be had of N. G. Mitra, Chandney Chowk, Calcutta. For small machineries, etc., you are referred to the Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

3288 A. T. C., Sukkur.—We do not undertake buying or selling on behalf of our subscribers. Many of our advertisers will be glad to undertake business.

3290 D. P. C. P., Kanauj.—List of newspapers published in India will be found in Thackers Directory, 6, Mangoe Lane, Calcutta.

FOR THE COLD SEASON.

Woolen Danigol & Snuff and Navy Blue Colours Over Coat Rs. 12/8; Sporting Coat Rs. 9, Serge Coat Rs. 9/8, Cloth—Swadeshi, Finally Superior. Goods are smart looking serviceable and cheap $\frac{1}{2}$ with order.

MAHINDRAKAR BROS.,

Bombay No. 4, or 12, & Poona City.

3292 M. S. T., Koilpatti.—For complete German printing outfit you can do no better than consult the Indo-Swiss Trading Co., 27, Pollock St., Calcutta. They will be also able to supply German paper.

3294 M. A. W., Bangalore.—Can supply fresh fruits and nice agarbathies. You should advertise in the pages of **Industry**.

3295 J. P. Ahmedabad.—Your enquiry has been dealt with above under No. 3163.

3296 D. B., Aurangabad.—For books on gilding etc., enquire of Ghuckerburty Chatterjee & Co. Ltd., 15, College Sq., Calcutta.

3298 N. R. K., Pedapatnam.—There are no commercial papers in Burma. Write to the Manager Standard Oil Co., 101, Clive Street, Calcutta for securing agency.

3299 V. K. J., Kallai.—For envelope cutting paper please enquire of Ghose Brothers, 63J, Radha Bazar St., Calcutta.

3300 M. L. S., Farrukabad.—Bristles are stocked by Indian Bristles & Lard Supply Co., 31|1, Tangra Road, Calcutta. Please enquire of them for hog skin, etc. You shall have to send samples of clay to colour manufacturers. A method of silvering mirror appeared in December issue.

3301 S. M. K., Sonpur.—Cardboard boxes may be bought of H. L. Sett & Sons, 8, Nilmoney Mitter Street and Dass & Kundu, 20, Gour Laha Street; both of Calcutta.

3302 A. M. K., Bhiria.—For picture post cards enquire of Lovenfosse & Co., Lindenstrasse 16-17, Berlin, S. W. 68, Germany. Cinematographs may be supplied by Johannes Nitzsche A-G, Karlstrasse 1, Leipzig, Germany.

3303 R. G. S. L. S., Rawalpindi.—For a list of newspapers of various provinces to insert advertisements write to the Calcutta Advertising Agency, 15, College Square, Calcutta.

3304 A. M. I., Bangalore.—To communicate with any querist write him with number and initials under care of **Industry** when your letters will be duly redirected.

3305 A. K., Rewari.—You may go through the *Dyeing of Textile Fabrics* by Mr. J. J. Hummel to be had of Book Co., 4|4A, College Square, Calcutta.

3307 A. M. K., Patna.—An article on rubber stamp making appeared in January 1924 issue of **Industry**.

3308 N. H., Hazaribagh.—Glass bottles may be bought of Calcutta Glass & Silicate Works, Belgachia and S. K. Dey, 124, Shova Bazar St., both of Calcutta.

3309 R. V. D., Gwalior.—An article on process block making appeared in February 1923 issue.

3310 M. G. A., Masar Road.—In preparing sealing wax you need not use any machine except iron pan for boiling and mould.

3312 S. A. C., Shanmuganathapuram.—You need not take any special licence for importing motors, etc., except the trade licence. Take legal advice for copyright.

3313 M. R. M. A., Coimbatore.—Hardwares may be supplied by Shalabhoy Tyejee & Sons, 28|32, Bank Street, Fort, Bombay and Abinash Chandra Dutt & Co., Monohar Dass Chowk, 208, Harrison Road, Calcutta. Process of enamelling on gold will appear in an early issue.

3314 R. R. M., Tapeswaram.—You may consult Thacker's Indian Directory, to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta.

3315 D. H. R. S., Peshawar City.—If you refine 'til' oil according to the processes given in the book the bad smell will be greatly removed.

3317 S. A. K., Kasur.—Match machines may be bought of Bhawani Engineering & Trading Co., 122|1, Upper Circular Road, and Bengal Small Industries Co., 91, Durga Charan Mitter Street; both of Calcutta.

3318 G. B. P., Bombay.—For culture pearls enquire of P. Orr & Sons Ltd., P.O. Box No. 317, Madras.

3320 R. A. R., Chicacole.—For picture post cards refer to No. 3302 above.

3321 C. P. J., Trichur.—A series of articles on butter making appeared in May, June, July and August 1920 issues of **Industry**.

3322 K. C. L., Khurda.—Sabadilla seed may be bought of S. N. De, P.O. Box 7851, Calcutta.

After extracting the juice then filter. Violet aniline may be bought of Amin Chand Mehra & Sons, 34 Armenian Street, Calcutta. Glass bottles of required descriptions may be bought of Satya Charan Pal, 194 Old China Bazar Street, and S. K. Dey, 124 Shova Bazar Street; both of Calcutta. Wants to buy dried banana.

3323 J. N., Bombay.—Imitation diamonds may be supplied by Krementz & Co., Newark, New Jersey and Davidson & Schulab Inc., New York; both of U. S. A. Imitation gold may be supplied by I. Stern & Co., New York, U. S. A.

3324 T. N. C., Canal Patwari.—Wants to be put in touch with exporters of frogs. Process of constructing lime kilns appeared in December 1923 issue. Process of preparing gut appeared in November 1922 issue. Guts may be supplied by Ad. Meyer, 5, South Tangra Road, Calcutta. For historical books enquire of Book Co., 4/4A, College Sq., Calcutta.

3326 R. K. D., Cawnpore.—Reply to your queries appeared in February issue under No. 3005.

3327 G. S. S. C., Gopalamudram.—For flavouring tobacco used for chewing with betel go through Indian Tobacco and its Preparations published from this Office.

3331 S. A. C., Shanmuganathapuram.—For manufacturing aluminium name plates you require only dies and punching machines which may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

3332 D. K. S., Pyuztaza.—For books on dairy farming write to Book Co., 4/4A, College Sq., and Thacker Spink & Co., 3 Esplanade East; both of Calcutta. Dairy utensils and apparatuses may be had of Jupiter Trading Co., Mulji Jetha's Market, Karachi.

3333 K. C., Rawalpindi.—Process of galvanising appeared in August 1925 issue.

3335 J. P. K., Agra.—Calcined magnesia may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

3336 S. A. C., Shanmuganathapuram.—List of trade journals of the world appeared several times in these columns.

3337 J. P., Cochín.—The books you require may be had of Book Co., 4/4A, College Square

and Thacker Spink & Co., 3 Esplanade East; both of Calcutta.

3339 B. L., Dacca.—Your queries have already been replied.

3340 S. B., Bikaner.—You may go through the following trade journals: British Dominions Trade, 15 Bedford Street, London W. C. 2; Canadian Export Pioneer, 110 St. Martin's Lane, E. C. 4; Commercial America, The Philadelphia Commercial Museum, 34th. St., Below Spruce, Philadelphia, U. S. A.; The Chamber of Commerce Journal, 5 Henche Itchome, Yokohama Japan; The Empire Mail, 212 High Holborn, London W. C. 1; Uebersee Post, 10 Solomonstrasse, Leipzig, Germany and Dun's International Review, The Mercantile Agency, 290 Broadway, New York, U. S. A.

3341 P. V. P., Mysore.—Tablet making machines may be bought of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

3342 M. M. G., Insein.—Wants to be introduced to the manufacturer of Evasex and Neosex. As regards homeopathic colleges correspond direct with the advertisers.

3345 S. R. K., Jubbulpore.—For selling used postage stamps advertise in the Sale and Exchange pages of Industry.

3346 P. A. S. S., Palamcottah.—There is a kind of grinding machines specially designed for powdering coffee. The above machine may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta. For industrial books enquire of Book Co., 4/4A, College Square, Calcutta.

3347 P. N., Sambalpur.—Derby Sweep tickets are not sold to public. These are now bought through Secretary, Royal Calcutta Turf Club, 13 Russel Street, Calcutta.

3348 S. G. C., Dindigul.—Recipes of blue black ink will be found in November 1922 issue.

3352 V. G. V., Bombay.—Fresh milk has been found to contain water, 87.300; butter, 3.000; casein, 4.820; milk sugar 43.90; phosphate of lime, 2.31; phosphate of magnesia, 0.42; phosphate of iron 0.07; chloride of potassium, 1.44; chloride of sodium 0.24 and soda in combination with casein 0.42

3353 G. S., Golmuri.—For distilling apparatus of required size write to Scientific Supplies Co., 29-30 College Street Market, Calcutta. You should use fresh flowers in manufacturing rose water.

3355 S. P., Quilon.—The following are some of the service securing agencies: Bharat Service Securing Co., Agra and Kapoor & Co., Fatehpuri Road, Delhi.

3358 S. B. J., Pendra Road.—Reply to your queries appeared in January issue under No. 2617.

3360 G. S., Kotah.—Reply to your letter was sent by post on the 18th December last.

3361 J. M. B. F., Parlakimedi.—Tin boxes may be bought of Rampratap Gajanan, 6 Halsi Bagan Road, Calcutta. For label printing write to Calcutta Fine Art Cottage, 76 Dharam Street, Calcutta.

3363 S. D. M., Kuala Lumpur.—For pickles enquire of Murshidabad Jam Pickles Co., Jagani, Murshidabad and Behari Lal Khasi Ram, Khari Baoli Street, Delhi.

3365 V. P. S. C., Ahmedabad.—Full address of the gentleman is Prof. K. S. V. Nath Pudukotai.

3366 K. S. N., Madras.—Dyeing recipes appeared in August and September 1925 issues of **Industry**. Process of discharging colours appeared in January, 1924 issue. Recipes of artificial assafetida will be found in July 1923 issue. You perhaps mean sealing wax formula of which appeared in September 1924 issue. Process of preparing "tilak" appeared in December 1925 issue. Formulas of louse killer appear elsewhere in this issue.

3367 M. A., Rai-Bareilly.—For oil mills write to Burn & Co., Hongkong House, Council House Street and T. E. Thomson & Co., 9 Esplanade, East; both of Calcutta.

3369 M. B. T., Pegu.—For rubber stamp making outfits write to S. C. Dutt & B. K. Dutt, 100 Durga Charan Mitter Street, Calcutta.

3371 A. C. D., Banosa.—Envelope making machines may be bought of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

3372 T. V. A. V. S., Sivakasi.—It will be advisable for you to indent the mantle making machines through Oriental Machinery Supplying Agency Ltd., 20/1, Lall Bazar Street, Calcutta, who will supply you with estimates and other allied information. Platinum wire may be supplied by Baker & Co., Inc., Newark, New Jersey, U.S.A. and Raritan Copper Works Perth Ambay, New Jersey, U.S.A. Mantle is not perhaps manufactured in India on commercial scale.

3373 M. P. S., Salem.—For books on Ayurveda write to N. N. Sen & Co. Ltd., 18/1, and 19 Lower Chitpore Road, Calcutta. There is no such journal known to us.

3374 A. S. S., Bulandshahr.—Refer your query to the Hindusthan Association, 116 West 39th Street, New York, U. S. A.

3375 S. K. A. B., Patna City.—The following are some of electrical engineers: Indian Electric Development Ltd., 46 Tamarind Lane, Bombay; Oriental Electrical & Engineering Co., 26 Military Square Lane, Bombay; Narsing Sahay Madan Gopal, 11-12 Portuguese Church Street, Calcutta; Stephens & Co., 7, Daere's Lane, Calcutta; Bharat Electric Co., Garden Road, Camp Karachi; Eastern Electric & Trading Co., Preezy Road, Karachi; M. T. Rajen & Co., 1-195 China Bazar Road, Madras; D. L. Sastri & Co., 12 Thambuchetty Street, Madras; Electric Stores Ltd, Chandni Chowk, Delhi and Hinnmat Singh, Chandni Chowk, Delhi.

3376 K. T. A. C., Cannanore.—Brass reeds may be supplied by Hermann Grosse, Greiz, Germany.

3378 R. S. B., Delhi.—We are not aware of the book mentioned by you.

3379 G. H. M. J., Bassein.—It is not possible to prepare spirit at home. Procure absolute

FANCY STRIPED

English Cambrics Zephyr and Mercerised. Twills of various designs and colours. Suitable for Shirts, Frocks, etc. Prices from Ans. 12 per yard. Post free. Write for Samples.

MASTER BROS.,

From Terminus; Tardeo; Bombay.

alcohol from the market for use in perfumery. Wants full address of La Parfumerie of France.

3385 M. M. L., Rawalpindi.—A formula for developing photo plates etc., will be given shortly. Great technical knowledge will be required in preparing P. O. P. papers. For positive plate camera please enquire of J. J. Shah, Sandhurst Road, Bombay 4.

3386 D. F. Goa.—An article on brewing and malting appeared in December 1925 issue where you will find every detail about making beer from barley.

3387 A. H., Ranchi.—Lead foils may be bought of Amitava Ghose, 133 Canning Street and B. K. Paul & Co, 1-3 Bonfields Lane; both of Calcutta. **Industry** is the only paper of its kind in India. You perhaps mean some patent article the formula of which is not known.

3388 R. B., Rajgangpur.—Tanning and dyeing materials are exported by M. M. Ispahani & Sons, 51 Ezra Street; S. Barnett & Co, 3 Clive Street, C. A. Mohamed, 15 Synagogue Street and David Sassoon & Co., 4 Lyon's Range; all of Calcutta.

3389 B. L. M. B., Barpara.—The following are some of importers of Indian produce in Basra; Menash I Bekhor, Dawoodally & Co, H. Abdul Karim & Co; A Bashayan & Son and Naoum Fathallah. For complete list go through March 1921 issue of **Commercial India**.

3390 M. M. I., Tisaiyanyilai.—For glues of required description enquire of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

3392 V. L. R., Cuddapah.—An article on preparation of dry cell appeared in November 1925 issue. Cameras may be supplied by Germania Kamera Work, Dresden A-19; Kamera Werkstaten, Zinzendorfstrasse 49, Dresden A. 9 and Conard A. Muller & Co., Strengenber near Nurnberg; all of Germany.

3395 K. N., Allahabad.—Refer your query to S. R. Batliboi, 9 Grants Lane, Calcutta.

3396 H. N. I., Jhansi.—Janakpur referred to in our article is in Muzaffarpur and not in U.P.

3397 R. B., Hardoi.—Recipes of hair dyes will be found in January 1925 issue. For hair

oil you may go through the booklet Hair Oil Manufacture published from this office.

3398 S. S. S., Amritsar.—For gallnut and logwood extract enquire of S. N. De, P.O. Box 7851, Calcutta.

3399 T. R., Bangalore City.—An exhaustive article on match industry appeared in July 1922 issue. An article on chemical industry appeared in July 1923 issue. A series of articles on soap industry will be found in the 10th. Volume and a series of articles on sugar industry will be found in the 11th volume of **Industry**. An article on paper manufacture appeared in April 1925 issue.

3400 R. C. S. P., Badulla.—Process of manufacturing cement appeared in June 1924 issue of **Industry**. Embroidery machines may be supplied by Joh. Klass, Rentlingen-Sud, Wruiltbg, Germany; Fortuna Machine Co, 172 Duane Street, New York, U.S.A. and Ames Chas F & Co, 90 West Street, New York, U.S.A.

3401 A. B. C., Bellary.—Biscuit making machinery suiting your requirements may be imported from Germany through The Oriental Machinery Supply Agency, 201, Jall Bazar St., Calcutta. They will furnish all particulars regarding same.

3402 A. B., Ludhiana.—Your purpose will be served by Export and Import Lists published by the Collectors of Customs of the respective ports of India. Some of the newspapers of Basra, Bagdad, etc. have been mentioned in the Brief Query Column of the last issue.

3404 P. V. R., Godavary.—The chemicals mentioned by you may be had of B. K. Paul & Co., Bonfields Lane, Calcutta.

3405 B. Y. Modak.—Wants lamps or lanterns needed for chromopathy.

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An expert gives out his secrets of making soaps of all kinds. "**PRACTICAL GUIDE TO SOAP MAKING AND SELLING**" Teaches also how to find the market for your soaps. Price Rs. 4. Orders before 21st April at Rs. 2 Only.

COM. BOOKS PUBLISHING COMPANY,
P.O. Teppakulam, Madras.

3406 G. L. V. Ludhiana.—You may enquire of Thacker Spink & Co., Esplanade, Calcutta. who are agents for Government publications.

3407 B. L., Rangoon.—The raw materials needed for making button photos may be had of Smith Stainstreet & Co., Dalhousie Sq., Calcutta. Tobacco may be strongly perfumed with such lasting scents as musk, rose and sandal ottos, civet etc. Gallnut is known in vernacular as "majuphal." For license regarding broadcasting station write to the Director of Wireless, Post and Telegraph Department, Delhi. Rubber stamp making materials may be had of S. C. Dutt & B. K. Dutt, 100 Durgacharan Mitter Street, Calcutta. An article on the subject appeared in January 1924.

3408 M. S., Hospet.—Formulas of articles mentioned by you appear from time to time in the columns of Small Trades and Recipes. Addresses of manufacturers of copying pencils of Czechoslovakia may be ascertained through the services of the Czechoslovak Trade Journal, P.O. Box 476, Prague 11, Czechoslovakia.

3409 S. R., Madura.—Tamil equivalents of the chemicals mentioned are not known.

3411 G. A., Delhi.—Mastic is known in Hindi as "rumi mastiki, kundur-rumi" etc. There is no difference between petrol and petroleum. You shall have to seek expert advice regarding chlorination of lime.

3413 I. L. M., Tuticorin.—Scents and colours may be had of D. G. Gore, 31 Mangaldas Road, Bombay. For art printing try Maneklal Maganlal, & Co., 34 Church Gate St., Bombay. For paper and pasteboard, etc. enquire of John Dickinson & Co. Ltd., Ballard House, Fort and Commercial Stationery Mart., 62 & 64 Ghogra St., both of Bombay. For all kinds of tobacco requisites please enquire of Empire Tobacco Co., Medows St., Fort and Kamruddin Hakkimji, 321-22 Crawford Market; both of Bombay. For cigarette machines please enquire of Imperial Machine Co., near Parsee Statue, Bombay. Yarns may be had of Advance Trading Co., 14 Medows St., Bombay. Machineries can be supplied by Imperial Machine Co., near Parsee Statue, Bellasis Road, Byculla, Bombay.

3415 A. P. N. S., Cochin.—For further particulars regarding dry plantain please go through the article on Plantain in this issue. Your other enquiry being in the nature of an advertisement cannot be published in these columns.

3416 S. R. S. W., Dacca.—You can dispose of your soaps by advertising in the pages of **Industry**.

3417 A. C. K., Turbela.—Soda water machines & requisites may be had of Little & Co. 3 Grant Lane, Calcutta.

3421 G. D. R., Nasirabad.—Red oxide may be required by paint mixers, soapstone by soap-makers, graphite by pencil manufacturers. You shall have to advertise to dispose of large quantities. It is not possible to furnish a list of all the electrical establishments of India. Consult a Directory.

3422 R. L., Gaya.—Cocogem is prepared by Tata Oil Mills Ltd, Tatapuram, Cochin State. Formulas for coconut butter appeared in the XI volume of **Industry**. For particulars of watches, clocks of special type please enquire of West End Watch Co., Dalhousie Sq., Calcutta.

3423 A. T. C., Sukkur.—Powders and ointments, etc. may be perfumed with essential oils and scents such as ottos.

3424 A. S. F., Benares.—Coconut oil may be had of (1) Pragjee Jayaram Tanna, Malabar Coast, Cochin. (2) Panch Kowrie Tat & Sons, 5 Meer Bahai Ghat St., Calcutta. Palm oil may be had of B. K. Paul & Co., Bonfields Lane, Calcutta. Addresses of picture merchants of Egypt are not known.

3425 G. V. R. R., Kalanagunta.—You better write direct for the prospectuses of the two foreign universities referred to.

SETT DEY & Co

ORIGINAL HOMEOPHARMACISTS,
42, Strand Road, Calcutta.

Dealers in Original Homoeopathic dilutions
and Biochemic Triturations.
Catalogue Free On Application.

3426 H. R. V., Rajgangpur.—Market rates of the Indian produce mentioned by you are published regularly in the pages of **Commercial India**, the sister of **Journal to Industry**.

3433 W. F., Jherriah.—Your query being in the nature of an advertisement cannot be published in these columns.

3434 R. R. D., Moibang.—Wants a second hand soda machine.

3435 R. S. J., Gaya.—Sole agents of Dietz lantern are Elliot & Co., 6A, Clive Row, Calcutta. For unbreakable slates enquire of Schieferin Austria M. & O. Schmidt, Saalfeld 6, Thur, Germany.

3437 S. S. S., Hindupur.—We are not aware of the particular address you want.

3438 B. A. K., Barela.—Unemployment is rampant in Calcutta. To secure service is next to impossible. Keep yourself contented with your position.

3439 M. H., Kotah.—Catechu will be obtained in both the stages of the recipe referred to by you but one will be inferior to the other and adulterated.

3444 S. B. J. S., Bentola.—You will meet with the dealers of articles mentioned by you in the advertisement pages.

3448 D. N. G. R., Tiruvadi.—We regret to be unable to suggest you any other book seller from where the book may be had. For book binding paper please enquire of Ghose Bros. 63J, Radha Bazar Street, Calcutta. The address referred to is sufficient.

3449 S. W. G., Bhadreswar.—The process of solidifying mercury with herbs is not known. Preparation of printing blocks is best learnt as an apprentice. For Nagri types please enquire of Indo-Swiss Trading Co., 27 Pollock

St., Calcutta. Books on gardening may be supplied by Chuckerberty Chatterjee & Co., 15 College Square, Calcutta. The most authoritative treatise is **Indian Medicinal Plants** by Major B. D. Basu. You shall have to purchase sand from Magra.

3452 S. A. R., Secunderabad.—Secondhand clothings are sold in bulk by various Army Departments. Apparatuses for filling rubber balloons may be supplied by A. R. Khan & Sons, Chanda, C.P.

3453 B. C. B. G., Jodhpur.—Refer your query to the Secretary, Students' Advisory Committee, 7 College Square, Calcutta.

3454 C. A. K., Cannanore.—Tobacco cutting machine may be had of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar, Street, Calcutta. For industrial books enquire of Book Co., 4/4A, College Square and Thacker Spink & Co., 3 Esplanade East; both of Calcutta.

3455 V. M. P., Madura.—If you go through Sale and Exchange pages of **Industry**, you will find addresses of parties willing to dispose of secondhand match machines. For match manufacture secure wood locally.

3456 G. R., Khallikote.—Tube wells may be supplied by City Tube Well Co., Kuver Ltd., 84 Clive Street; Swedish Trading & Engineering Co., 13/3 Old Court House Street, and Texas Tube Well Co., 5 Dalhousie Square; all of Calcutta. You may start flour milling, pulse splitting, oil milling, etc.

3457 J. K. D., Chittagong.—Catechu may be supplied by Madhab Chandra Daw, 4 Armenian Street and Banshidhar Dutt & Sons, 126 Khengraputty, Bara Bazar; both of Calcutta.

3458 S. P. R. C., Barisal.—Refer your query to the Secretary, Hindusthan Association, 116 West, 39th Street, New York City, U.S.A.

3460 E. K. L. G., Eakalapuram.—You may manufacture coconut oil, coconut oil and supply to various provinces. You may also try to prepare cigars from tobacco leaves.

3461 S. A. C., Ramnad.—Jeweller's tools are imported by L. Basack & Co., 5 Old Court House Corner, Calcutta. Gold and silver foils may be brought of Amitava Ghose, 133, Canning Street, Calcutta

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is a small income for a successful writer. All papers pay highly for the right kind of article. The only thing is, you should know how to write saleable articles and where to sell them. "COMPLETE GUIDE TO WRITING FOR THE PAPERS," by Rawfield, M.A., (Ready on 15th April) will give you exhaustive and expert guidance. Price Rs. 5/8. Orders registered before 15th April at Rs. 4 only.

ART BOOKS PUBLISHING CO.,
12, Teppakulam, P.O., Madras. P.

3462 B. K. G., Burhanpore.—Optical goods may be supplied by Merry Optical Co., Kansas City, Missouri; New Era Optical Co., Chicago, Illinois and Standard Optical Co., Geneva, New York, all of U.S.A.

3465 J. I. W., Tirthahalli.—Thank you for your suggestion.

3466 R. N. S., Jaipur.—There is no such university known to us.

3467 M. A. R. B., Kymore.—Corks of required description may be supplied by P. S. Dutt & Bros., 8 Ezra Street, Calcutta.

3469 B. C., Ahmedabad.—Process of softening rubber for moulding purposes will be found in June 1923 issue of **Industry**.

3470 A. S. S., Masulipatam.—Formulas of lime juice glycerine will appear in an early issue.

3471 N. L. G., Bhusaval.—For blending tea go through July 1925 issue.

3473 K. R., Karachi.—Picture post cards may be supplied by E. David, Cite Rougemont 8, Paris, France; Photochem G. m. b. H., N. Stolpischestrasse 37, Berlin, Germany; Rommler & Jones G. m. b. H., Blasewitzerstrasse, 27, Dresden, Germany; Photo Printing & Publishing Co. Ltd., C. Central Chambers, 17A, South Castle Street, Liverpool, England; Photo & Art Postal Card Co., 444 Broadway, New York, U. S. A. and Pastime Novelty Co., 1367 Broadway, New York, U. S. A.

• 3475 B. L. N., Calcutta.—For mosquito driving powder try stationers of Canning Street and Colootola Street.

3476 G. R. V., Sahiwal.—Soda ash and sodium silicate may be bought of Oriental Industrial Co., College Street Market, Calcutta and B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. Tallow may be supplied by Calcutta Tallow Mart, 19 Tiretta Bazar Street, Calcutta. The measurement referred to by you denotes the density of soda lye. Wooden toys may be supplied by Chicago Toy Works, Karachi; Delhi Toy Works, 68 Chandni Chowk Delhi; Sheik Nazir Ali, 5 New Market, Calcutta and S. Bahaji, 33, Cornwallis Street, Calcutta. Ice making machines may be had of Burn &

Co., Hongkong House, Council House St., Calcutta.

• 3477 R. L. P., Baroda.—Consult a physician. The recipe quoted by you is correct.

3478 P. T. G., Karachi.—Consult a building engineer for artificial and cheap building stone.

3479 T. A. R., Vaniyambadi.—Thread balling machines may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta. Processes of removing various kinds of stains from hides and skins will appear in an early issue.

3480 V. A. N., Madras.—Flour grinding mills are stocked by Burn & Co., Hongkong House, Council House Street; T. E. Thomson & Co., 9 Esplanade East and Marshall Sons & Co., 99, Clive Street; all of Calcutta Distilling apparatuses may be supplied by Scientific Supplies Ltd., 29-30 College Street Market, Calcutta. For label printing you have to procure a treadle printing machine which may be supplied by K. Banerjee, 8, Canning Street and Indo-Swiss Trading Co., 27 Pollock Street; both of Calcutta. Addresses of industrial and trade journals of the world appear elsewhere in these columns.

3481 K. K. H., Mandalay.—Your enquiry appears in the Trade Enquiry columns.

3482 C. C. S., Amalapuram.—The address of the gentleman referred to by you is not known.

3483 B. B. B., Calcutta.—Process of painting on glass appeared in October 1925, March 1925 and July 1923 issues of **Industry**. Confectioner's machineries may be supplied by Kustner Freres & Cie, 15A, Percy Circus, King's Cross, London W.C1; Jaburg Brothers, New York, U. S. A. and Thomas Mills & Bro, Inc, Philadelphia, U. S. A. An article on sathi food manufacture appeared in December 1921 issue. Sathi is manufactured by Amulya Dhan Paul & Co., 113, Khengraputty, Bara Bazar, Calcutta.

• 3484 B. N. B., Chitpore.—Recipe of gut reviver will appear in an early issue.

3486 N. L. C., Nagpur City.—Aluminium utensils may be bought of Jewanlal & Co., 55 Canning Street and Gobardandas Maniklal,

6013, Canning St.; both of Calcutta. Stock may be supplied by E. B. Bros & Co., 11, Dharamtala Street, Calcutta; Genz Wheeler & Co., Victoria, and Wai San Knitting Co. Ltd., Victoria; last two of Hongkong.

3487. C. D. D., Allahabad.—Glass bangles are stocked by Md. Abdul Gaffar, 133, Canning Street, Calcutta; F. Nalladaroo & Co., 501, Canning Street, Calcutta and S. Akbar Hossain Ansari, Mohaula Kotla, Firozabad, Agra.

3492 A. T. C., Bezwada.—Kohinoor pencil is manufactured by Eagle Pencil Co, Ashby Road, Tottenham, London, N. 17.

3493 M. R. B., Bhera.—Porcelain jars may be bought of Satya Charan Paul, 194, Old China Bazar St., Calcutta. "Chak mak" stone or flint stone may be supplied by Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta. White oil may be supplied by Anath Nath De, 4, Moidaputty, Bara Bazar, Calcutta. The following are some of share brokers; S. Seal & Co., 25, Swallow Lane; Murlidhar Chamarla & Co., 2, Royal Exchange Place and B. Mitra & Co., 2, Royal Exchange Place; all of Calcutta.

3494 W. C., Tirupati.—Optical goods may be supplied by Lawrence & Mayo Ltd., 44 Hornby Road, Fort; Baliwala & Hormi, Hornby Road and Cooper & Co., Kalbadevi Road; all of Bombay.

3495 G. S. L. S., Rawalpindi.—Tablet making machines may be supplied by Oriental Machinery Supply Agency Ltd., 201, Lall Bazar St., and Calcutta Industries Ltd., 136-17, Manicktala Main Road; both of Calcutta. Empty glass phials may be bought of Calcutta Glass & Silicate Works, Belgachia and S. K. Dey & Co., 124 Shova Bazar Street; both of Calcutta.

3498 S. L. R. P., Muttra.—To communicate with any querist write him with number and initials under case of **Industry** when your letters will be duly redirected. Your other query being in the nature of an advertisement should not be published in these columns.

3499 H. B., Bombay.—Refer to No. 3498 above.

3500 K. S., Narsapur.—First cleanse the old mirror then proceed with the directions given in the December 1925 issue for silvering mirror. Hosiery Mill, Bezwada.

3501 A. L. N. R., Masulipatam.—Reply to your queries appears elsewhere in these columns.

3503 M. T. B., Akyab.—Saddlery and harness may be supplied by Raghu Nath Prasad, 86 Bentinck Street; Nahney Lall Dabe Lall & Co., 150-11 Lower Chitpur Road; E. N. Mullick & Co., 5-4 Dharamtala Street, and Cuthbertson and Harper, 10 Govt. Place East; all of Calcutta.

3504 S. L. C. S., Hafizabad.—Razors may be supplied by Weelputz & Cie, Solingen; Moder-egger & Co., Hamburg 8; Robert Hohmann Sohne, Solingen; Emil Hermes, Merschied, Solingen and Max Dörner Razor Co. Ltd., Solingen; all of Germany. Dyes may be supplied by Tarbwerk W. Kump & Co, Hanau, a M; Reichhold Flugger & Boecking, Hamburg 35 and Walther & Behringer; Leipzig; all of Germany. Stationery goods may be supplied by Konrad Hanf, Hamburg 8a; Richard Müller, Geiseltasteig No, Munich and Krant & Meientorn, Erustrasse 10c, Elberfeld; all of Germany.

3505 S. B., Bhavnagar.—For exporting raw produce you may correspond with the following produce brokers: Alcock Amis & Co., 14 Mincing Lane, London E. C. 3; The Produce Brokers Co. Ltd., 24-28 St. Mary Axe, London E. C. 3 and Bramwell & Co., 252 Produce Exchange, Manchester, England.

3507 V. J. K. F., Assolna.—For chadars of required design enquire of Gleichman & Co., Ferdinandstrasse 6, Hamburg, Germany. For particulars of firms mentioned by you write direct to the parties. Wants to be put in touch with cotton and silk weaving firms at Calicut and manufacturers of silk cloth at Surat.

3509 M. T., Zingyaik.—Sex indicator may be supplied by S. P. North & Co., 771, Lower Circular Road, Calcutta.

3512 I. G. T. C., Cocanada.—Hosiery goods may be supplied by Calcutta Knitting & Woollen Mills, 281/2 Bowbazar Street, Calcutta; Aryan Hosiery Factory, Bangalore; Commonwealth Hosiery Factory, Mangalore and Andhra

Hosiery Mill, Bezwada.

3513 S. M. S. C., Bodinayakanevi.—Cardamoms are chiefly shipped to the United Kingdom and thence to other countries such as Germany, France and Scandinavia. For direct export you may correspond with produce brokers whose addresses appear under No. 3505.

3514 T. B., Pilibhit.—Reply to your queries appeared in January issue.

3515 S. A. S., Narsinghpur.—Sunlight soaps may be supplied by M. Framrose & Co., 9 Bank Street, Fort, Bombay. Buttons are imported by Khan and Khan, 10 Meadows St, Fort Bombay and Volkart Bros, 1 Rampart Rd, Bombay.

3516 S. N. C., Kharagpur.—Scarlet red may be brought of Amin Chand Mehra & Sons, 34, Armenian Street, Calcutta. Sweet oil may be bought of Anath Nath De, 4, Moidaputty, Bara Bazar, Calcutta. Can supply elephant bones.

3517 K. P., Bhagalpur.—Aerated water making machines may be supplied by Little & Co., 3 Grants Lane, Calcutta.

3518 R. S. S., Udupi.—Vegetable product is now being largely employed as adulterant in pure ghee. Vegetable products may be bought of E. D. Sassoon & Co., 100 Clive Street, Calcutta.

3519 G. G. R., Masulipatam.—Several addresses of firms of Bombay appear in these columns. Uses of oleic acid will appear in an early issue.

3520 A. P., Bombay.—Amber may be bought of S. N. De, Post Box 7851, Calcutta.

3522 R. B. W., Rajgangpur.—Refer your query to the Consul General for Japan, 7 Loudon Street, Calcutta.

3524 D. D., Dacca.—For therapeutic uses of "gorachana" and "shweta makal" consult distinguished kavirajas.

3527 V. N. S., Secunderabad.—For label printing you may write to Calcutta Fine Art Cottage, 76 Dharamtala Street, Calcutta and Maneklal Maganlal & Co., 34 Church Gate St, Bombay. Cardboard boxes may be supplied by cardboard Manufacturing Co., Angres Wadi, Bombay, H. L. Sett & Son, 8 Nilmoney Mitter Street, Calcutta; G. Mahadeo & Co., Sandhurst Road, Bombay and Kundu & Dass, 20 Gour Laha Street, Calcutta. Floral oils may be supplied by Khoda Bux & Co., 7 Colootola St., and Hajee Khoda Bush and Babi Buksh, Fouzdaree Balakhana, 87, Colootola Street; both of Calcutta.

Notices and Reviews.

Ferro-Printing Paper.

We request our readers to give a trial to the ferro-papers prepared by Mr. S. L. Dube, Jalalabad, Dt. Fategarh. U.P. It may be used for printing maps and photos from oil cloth and negatives.

Antiseptic Incense.

The noteworthy feature of Atal's Antiseptic Dhooni is that it emits fragrance and purifies the air at the same time. It may be had of The Three Star Trading Co., Chunimandi, Multani Street, Lahore.

Ink Powders.

Messrs. M. S. Sastry and Sons, Mambalam, Saidapet P.O., Madras have sent us sample packets of "Tilak" ink powders of different colours. We have used some which we have found satisfactory.

Thoughtful Pamphlets.

"Student Life" and "Character." By Mr. Kuchi Narosimham, B. A. To be had of Messrs. M. S. Sastry & Sons, Nambalam, Saidapet P.O., Madras.

A note of sincerity rings through the pages of these two pamphlets which have been compiled specially with a view to inculcate moral teaching among the student community.

Miniature Intaglios.

It is with delightful pleasure that we commend to the notice of our readers the miniature pictures of gods and goddesses engraved in gold, silver, ivory, etc., by the Novelities Manufacturing Co., Navsari Chambers, Outram Road, Fort, (Post Box No. 429) Bombay. The process of these charming engraved photos have been kept secret but we understand that the firm trains up apprentices in order to introduce the novelties far and wide.

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A Book On Naturopathy.

No. 2 of the Series on Hydropathy. By Babu Rakhal Chandra Chatterjee, B.L., 20/A, Kali Prasad Chakraverty Street, Calcutta. Price Rs. 1-4, Pp 144.

We have had occasion before to refer to the valuable works of the author, an ardent champion of Naturopathy. In an earlier book, he dealt with the treatment of the common ailments by hydropathy. The present treatise he has devoted exclusively to the application of naturopathy to surgical cases. He shows for instance, with authoritative citations, how small-pox and leprosy should be treated, how cancers and carbuncles can be healed without operation, what to do in case of accidents and the like. Those who trust Nature as a curative agent will find the book a useful guide.

Calendars And Almanacs.

We accept with pleasure four calendars from Mr. S. V. Sovani, B.Sc., Girgaon Road, Bombay. He is a dealer in scientific apparatus and deserves our patronage.

We acknowledge receipt of a sheet calendar and one date almanac from Ayurvedic Medical Hall, Coringa, Godavary.

Our indebtedness to the Vishnu Weaving Works, Chawa, Cannanore, manufacturers of cotton piece-goods, in respect of one date almanac.

Mr. S. R. Gupta, M.I.A.C., of Chitnavis Park, Nagpur City, who is an importer of fancy goods and novelties and specialist in magic and mesmerism, has sent us a beautiful coloured picture with calendar.

Trade Enquiries.

[To communicate with any party write him direct with name and address as given below, mentioning **Industry**.]

3377 Janak Singh Jagadish Narayan Singh, Jharia, Dt. Manbhum.—Desire to be introduced to purchasers of lichi fruits of Muzaffarpur and mango of Muzaffarpur and Darbhanga.

3382 Rai Bros., Rajgangpur, B. N. Ry.—Wish to be introduced to purchasers of myrobalans, sonari bark, oil seeds, tamarind and other forest products.

3414 The Malabar Swadeshi Stores, Mattancherry, Cochin—Want to be introduced to dealers in fancy tins with crompton or liver lid of different sizes.

3418 The Atlas Trading Co., Katra Bhai Sant Singh, Amritsar.—Desire to be put in touch with suppliers of gut in India.

3463 Mrs. N. E. Anthony, C/o. Lt. Col. Anthony I.M.S., Hyderabad, Sind—Wants to purchase soap nut powder.

3464 J. K. Misra, 90 Bhagalpur Lane, Dacca.—Can supply simul cotton in a large quantity: also can supply scrapes of horns.

3468 Annada Ch. Datta, 96/1, Masjidbari Street, Calcutta.—Wants to be introduced to purchasers of charcoal and suppliers of "Asoka" bark.

3481 Ko Kyaw Hla, 32, Bombine Ave, Mandalay.—Wants to be put in touch with manufacturers of white celluloid name plates.

3486 Achhar Mall, English Copyist, Lyallpur, Punjab.—Wants regular supply of genuine pearls used in medicine.

3505 Shaban Haji Sheriff & Bros, Khojawad, Bhavnagar, Dist. Kathiawar.—Can supply dry sheep guts, groundnut oil cakes, mendi leaves and powder and nagar moth.

3506 Chowng kowaia, Kulikawn Bazar, Aijal, Lushai Hills.—Can supply ginger, dry ginger, turmeric and tiger's fat.

APRIL ISSUE OF INDUSTRY

(In the Press)

The April issue of **Industry**, which will be the First Special Number of Volume XVII, will deal with the subject of Co-operation from all points of view and will contain informative articles besides the usual features such as New Ideas, Small Trades, Industrial and Scientific Topics, Formulas and Processes, etc., etc. Any friend of our subscribers may get a copy free as sample on application to the Manager, **Industry**, Calcutta.

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woman's love, and to turn disobedient wives into obliging ones and many other valuable
suggestions.

Mr. A. K. Lukansy, Palmgroves, Bingerville (Ivory Coast); writes.

The Hidden Treasure:—In my opinion, if there was time, when the marriage topic
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